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ANNUAL REPORT

OF THE

BUREAU OF INDUSTRIES

FOR THE

PROVINCE OF ONTARIO

1891.

PARTS I, II, AND III.—AGRICULTURAL STATISTICS.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

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9/1/93.

TORONTO
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST.
1892.

TENTH ANNUAL REPORT

OF THE

BUREAU OF INDUSTRIES.

PARTS I, II AND III.

To the Honorable Minister of Agriculture:

Sir,—I have the honor to present herewith Parts I, II and III of the tenth annual report of the Bureau of Industries, being the Agricultural Statistics of Ontario for the year 1891.

I have the honor to be, Sir,
Your obedient servant,

C. C. JAMES,
Secretary.

Toronto, May 30, 1892.

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ANNUAL REPORT

OF THE

ONTARIO BUREAU OF INDUSTRIES.

PART I.

THE WEATHER AND THE CROPS.

THE WEATHER.

Meteorological tables throw a good deal of light upon the fate of the crops—for temperature, sunshine and precipitation have a close partnership with the soil in determining the quantity and quality of vegetable products. Therefore records of heat, light and moisture, and the extent of the covering of snow during winter, invite the attention of those who would understand the agricultural operations of the year, and hence the interest and importance attaching to the weather tables following.

TEMPERATURE. The table following shows the temperature from April to September, inclusive, (the growing season for the bulk of our crops) at ten well distributed stations, the figures being for 1890 and 1891, together with the average for the ten years 1882–91 :

Months.		Saugeen.	Birnam.	London.	Woodstock.	Stony Creek.	Toronto.	Lindsay.	Gravenhurst.	Ottawa.	Rockliffe.	Province average.
		°	°	°	°	°	°	°	°	°	°	°
April....	1891...	40.50	44.53	47.24	44.81	47.47	43.24	41.93	39.77	42.94	37 30	42.97
	1890...	38.92	43.16	46.09	43.72	46.09	42 31	40.33	38.83	39.64	36.08	41.52
	1882-91	38.58	41.13	43.28	41.96	43.17	40.91	39 22	37.73	39.78	36.41	40.22
May	1891...	48.08	51.61	56.17	52.75	54.99	51.51	52.10	50.65	53.21	48.40	51 94
	1890...	47.07	50.80	53.91	51.63	52.26	50 01	48.57	48.37	50.31	47.11	50.00
	1882-91	49.18	53.77	54.93	53.44	53.61	51.89	52.29	51.61	55 02	50.60	52.63
June	1891...	62.80	65 61	70.38	65.63	66.88	64.34	64 69	64.41	66.48	63 10	65.43
	1890...	62.53	66.30	66.67	67.95	69 34	65.31	65.42	65 77	64.37	62.57	65 62
	1882-91	59.74	64.09	65.12	64.56	65.19	62.59	63.07	62.65	65.52	61.00	63.35
July	1891...	61.30	63.44	66.79	63.84	67.70	63.69	62 35	62.73	64.15	61.00	63.70
	1890...	65.46	67.47	67.21	68.23	71 64	67 34	66.02	66.88	67 42	64.18	67.19
	1882-91	63.52	67.18	68.10	67 71	69.94	67.11	65.97	65.98	68.31	64.09	66.79
Aug.	1891...	63.01	65.70	67.95	65.66	68.08	65.56	64.21	62.57	65.44	59.88	64.81
	1890...	61.43	63 45	63 20	64.17	67.19	64.49	61.89	62.40	64.14	58.27	63.06
	1882-91	62.54	64.81	65.32	64.78	67.86	65.31	63.32	63.10	65.33	60.84	64.32
Sept.	1891...	60.31	62.37	64 46	62.54	64.78	62.49	60.78	60.45	61.55	55.55	61.53
	1890...	54.15	57.66	59.39	57.42	59 71	57.46	56.07	55.41	56.08	51.18	56.45
	1882-91	56.64	59.63	59.36	58.68	60.98	58.72	56.42	56.49	57.41	53.30	57.76
Ave. for 6 m'ths.	1891...	55.99	58.88	62.16	59.21	61.65	58.47	57.68	56.76	58.96	54.21	58 40
	1890...	54.93	58.14	59.41	58.85	61.04	57.82	56 38	56 28	56.99	53.23	57 31
	1882-91	55.03	45.44	59.35	58.52	60.12	57.75	56.72	56 26	58.56	54.37	57.51

The average of the Province for the six months was 58 40°, being 1 09° above that of the previous year and .89° more than the average of the six months during the ten years. Every station exceeded its own temperature for the six months in the preceding year, and Rockliffe was the only place that failed to equal its record for the ten years. For the whole Province, April was well ahead of its average in both 1890 and 1882-91. May exceeded its own temperature of the previous year, but did not reach the average of the month for the ten years. Although June did not equal the figures of 1890, the temperature was 2.08° ahead of its average for the years 1882-91, and it was the hottest month of the year 1891. July, on the other hand, was a comparatively cold month, the temperature averaging 63.70°, against 67.19° in the preceding year and 66.79° in 1882-91. August had a higher average temperature than in 1890 or the average of the ten years. The thermometer ranged abnormally high during September, the average for the Province marking 61.51°, or 5.08° higher than in the previous year and 3.77° more than the average for the ten years.

SUNSHINE. The following table gives the record of sunshine at five stations during the six months April—September for the years 1890 and 1891, and also the average for the nine years 1883-91. The hours of possible sunshine placed in the last column are calculated for latitude 45° :

Months.	Woodstock.	Toronto.	Barrie.	Lindsay.	Kingston.	Province averages.	Sun above horizon in Lat. 45°.
	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
April 1891	186.1	195.3	176.1	210.5	185.3	190.7	406.4
April 1890	199.0	229.3	169.1	223.4	229 0	210.0	
April 1883-91.	191.6	196.3	167.2	206.0	193.6	190.9	
May 1891	245.4	236.0	213.8	227.4	225.2	229.6	461.1
May 1890	182.6	184.7	143.7	172.6	189.0	174 5	
May 1883-91.	206·9	222.1	197.1	219.4	216.9	212 5	
June 1891	247.3	242 4	234.4	271.7	231.6	245.5	465.7
June 1890	253.5	265.7	238.4	252.8	263.3	254 7	
June 1883-91.	240.2	261.2	227.2	258.9	243.3	246.2	
July 1891	275.7	247.7	231.0	242.4	249.2	249.2	470.9
July 1890	289.8	301.3	243.1	272.9	292.0	280 4	
July 1883-91.	268.9	285.3	253.1	276.7	267.1	270.2	
Aug 1891	222.0	220.5	205.9	207.6	230.7	217.3	434.5
Aug 1890	240.5	249.5	218.7	229.7	234.8	234.6	
Aug 1883-91.	229.7	250.4	213.8	233.3	246.3	234.7	
Sept 1891	231.0	251.7	220.3	237.6	214.5	231.0	376.3
Sept 1890	197.2	209.4	169.5	210.2	189.4	195.2	
Sept 1883-91.	201.6	216.4	152.1	208.4	200 5	195 8	
Totals 1891	1,407.5	1,393.6	1,281.5	1,397.2	1,336.5	1,363.3	2,614.9
Totals 1890	1,362 6	1,442.9	1,182.5	1,361.6	1,397.5	1,349.4	
Totals 1883-91	1,338.9	1,431.7	1,210.5	1,402.7	1,367.7	1,350.3	

Out of 2,614.9 possible hours of sunshine for the whole Province during the six months, 1,363.3 hours were registered, being 13.9 more than in 1890 and 13.0 more than the average for the nine years. There was a decrease of sunshine in April, June, July and August compared with their respective records of both 1890 and 1883-91, but the increase of sunshine in May and the unusual brightness of September lifted the total of the six months to the high place above quoted. Woodstock experienced more sunshine than any other station, 1,407.5 hours being registered, while Barrie had the least, only 1,281.5 hours being observed At every station except Kingston there was more sunshine recorded in September than in August.

PRECIPITATION. The following table gives the fall of rain and snow by districts during what may be regarded as the winter months, for the years 1890 and 1891, together with the average for the ten years 1882-91 :

Months.		West and southwest.		Northwest and north.		Centre.		East and northeast.		Province averages.	
		Rain.	Snow.	Rain	Snow.	Rain.	Snow.	Rain.	Snow.	Rain.	Snow.
		inch.	inch	inch.	inch.	inch	inch.	inch.	inch.	inch.	inch.
November	1890.	2.92	2.9	1 73	6 5	3 38	3.0	1.82	4 9	2.46	4.3
	1889.	2.91	9.1	1.76	13.6	2.53	9.1	2.29	12.3	2 37	11 0
	1882-90	2.43	6.2	2.04	13.8	2.30	5 5	1.96	9.1	2.18	8.6
December	1890 ..	0 31	25.1	0.84	35 7	0.13	15 2	0.11	14.2	0 35	20.1
	1889	3.99	0.3	2.35	13 2	4 01	2.1	2.45	9.5	3.20	6.3
	1882-90	1.45	15.5	1.20	22 3	1 37	12.1	1.04	14.7	1.27	16.1
January	1891 ..	1.59	8.0	0 93	16.4	1 84	13.2	1.11	18.1	1.37	13.9
	1890 .	3.44	4.7	1 93	25.5	2 78	8.9	2.19	12.6	2.59	12 9
	1882-91	1.40	15.9	1.09	28.5	1 39	17.9	1.06	22.0	1.24	21.1
February	1891 .	2.73	6.2	1 28	18.4	1.72	12.9	1 35	15.5	1.77	13 3
	1890 ..	1.82	6.2	0.85	20.7	1.88	9.1	1 86	15.4	1.60	12.9
	1882-91	1.79	10.7	0.78	22.0	1.37	11.9	0.90	18.5	1.21	15.8
March.....	1891 ..	1.48	13.4	0.50	24 8	1.43	17.7	2.44	23.1	1.46	19.7
	1890 ..	1.05	11.1	0 59	17.5	0.86	10 8	0.74	13.1	0.81	13.1
	1882-91	1.28	11.0	0.81	15.0	1.12	10.8	1.01	15.1	1.05	13.0
Total.....	1891 ..	9.03	55.6	5 28	91 8	8.50	62.0	6.83	75.8	7.41	71.3
	1890 .	13.21	31.4	7.48	90.5	12.06	40.0	9.53	62.9	10.57	56.2
	1882-91	8.35	59.3	5.92	101.6	7.55	58.2	5 97	79.4	6.95	74.6

In considering this table it should be remembered that an inch of rain is the equivalent of ten inches of snow, which fact will go to show that the heavy precipitation of snow over the whole Province compared with that of the previous year is more than discounted by the rainfall of the earlier period. On the other hand, while the fall of snow does not equal that of the average of ten years' period, the precipitation of rain puts the balance in favor of the year 1891. November was marked by a heavy rainfall and very little snow. December, on the contrary, had hardly any rain while 20.1 inches of snow fell. January and February had very little out of the ordinary to mark them, but March had a greater fall of rain than usual and a heavy precipitation of snow. For the five months the northwest and north district had 91.8 inches of snow, while the west and southwest had but 55.6 inches.

The extent of drouth or rainfall during the growing weather, however, is of the greatest importance. The table following gives the precipitation for each of the six months April—September, together with the total for the season and also the average for the ten years 1882-91 :

Month.	West and southwest.		Northwest and north.		Centre.		East and northeast.		Province averages.	
	1891.	1882-91.	1891.	1882-91.	1891.	1882 91.	1891.	1882-92.	1891.	1882-91.
	inch	inch.	inch.	inch.	inch	inch.	inch.	inch.	inch.	inch.
April	1.74	1.71	2.04	1.45	1.81	1 60	1.49	1.41	1.77	1.54
May	1.48	3.16	0.66	2.44	0 62	2.52	1.53	2.41	1.07	2.63
June	1.98	3.28	1.11	2 72	2 49	3 09	1.76	2.77	1 84	2 97
July	3.17	2.58	3.87	2.62	2.84	2.35	4 12	3.01	3 50	2.64
August.	3.78	2.79	4.18	2 74	4.14	2.50	3.64	2.73	3 93	2 69
September....	2.22	2.33	2.34	2.91	2.07	2.38	1.48	2.46	2 03	2.52
Totals.....	14.37	15.85	14.20	14.88	13.97	14.44	14.02	14.79	14.14	14.99

The months of April, July and August exceeded their respective averages for the ten years in the matter of rainfall, but the precipitation in each of the other three months was not so large as usual, the result being that the total rainfall for the Province during the six months was 14.14 inches, or .85 inch below the average for the years 1882 91. May and June gave two months in succession of unusual dryness, and July and August followed together with a remarkably large amount of moisture. The most rain was gauged in the centre district, where 15 97 inches were recorded in the six months, while the least rainfall was observed in the east and northeast district, being only 14.02 inches.

THE CLIMATE OF THE RAINY RIVER DISTRICT. As much attention is being directed to the lands lying to the north and east of the Rainy river and Rainy lake, it will doubtless prove interesting to place here for reference and comparison some observations made by Mr. W. Woods, of Little Forks, Rainy Lake, a correspondent of the Meteorological Department.

Rainy River and Rainy Lake lie between degrees 48 and 49 north latitude. They are therefore about 350 miles farther north than the city of Toronto, and 440 miles farther north than the southern boundary of Essex county.

An interesting comparison may be made between the accompanying table and those previously given for the Province. It will be noticed as being most remarkable that the average temperature of the lake district for the six months, April to September, 1891, was 56.1°, while the average of the ten stations in the older portion of the Province was 58.4°. Although situated so much further north than the older settled districts, the average temperature of the growing months was only 2.3° lower during the past year. The difference in rainfall and snowfall between the Rainy lake region and the older Province is quite noticeable. During the five months, November, 1890, to March, 1891, 7.41 inches of rain and 71.3 inches of snow fell in the Province on an average; whereas at Rainy Lake only 0.05 inches of rain and 46.7 inches of snow are reported. During the six months, April to September, 1891, the rainfall of the Province averaged 14.14 inches, whereas at Rainy Lake the extraordinary amount of 39.75 inches in reported. This would seem to indicate the appropriateness of the name *Rainy* applied to that district, but the name is in reality an English corruption of the French *Rene*.

The prevailing winds were from the west and southwest, with north and northwest principally in the winter months. Only two fogs were noticed in fourteen months.

NOTES FROM REGISTER AT RAINY LAKE, 1890-91.

1890—October 24th—Geese flying south.

November 3rd—Farmers still plowing.
" 15th—Navigation still open.
" 22nd—Navigation closed. Indians say this was the finest autumn since 1876.
" 29th—First snow to remain.

December 20th—Ice on Rainy River broke up.
" 21st River clear.
" 23rd—River frozen up.

1891—March 11th—First thaw.
" 20th—Rainy River open at Little Fork.
" 21st—First rain of season.

April 11th—No snow on ground except in sheltered spots.

May 3rd—Last snow.

May 8th—First thunderstorm.

June 3-4—Hard frost.

July 7th—Frost. Thermometer 35°.

October 3rd—First time thermometer registered 32° this autumn.
" 26th—First snow.

November 11th—Navigation closed on Rainy River.
" 12th—Plowing stopped.
" 16th—First record below zero.

Abstract of the results of Meteorological Observations at Little Forks (Rainy lake) from November, 1890, to December, 1891, inclusive :

1890-91.	Temperature.							Mean temperature of dew point.	Mean relative humidity.	Mean amount of sky cloude'.	Mean force of wind.	Winds from									Rain.		Snow.			
	Mean.	Highest.	Lowest.	Mean daily range.	Greatest daily range.	Mean temperature of warmest day.	Mean temperature of coldest day.					N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Calm.	Amount.	Days.	Amount.	Days.	Number of fogs.	Number of thunder storms.
1890.	°	°	°	°	°	°	°	°			0-10										in.		in.			
November	29.38	54.0	1.0	15.6	26.0	41.4	9.0	29.0	94	0.5	3	20	0	0	0	8	10	29	23	0	0.65	1	3.2	10	0	0
December	—0.28	36.0	—26.0	11.8	26.3	25.9	—19.5	.....	83	0.4	2	10	0	3	1	7	21	34	17	0	0.00	0	9.0	9	0	0
1891.																										
January	3.23	28.0	—21.5	11 5	23.5	20 7	—18.7	2.7	86	0.4	2	12	0	2	3	13	24	36	3	0	0.00	0	10.5	9	0	0
February	3.58	32.0	—32.5	16.1	36.5	25.7	—20.8	4.7	84	0.5	2	31	3	4	3	10	7	14	12	0	0.00	0	18.0	7	0	0
March	22.28	60.0	—20.5	19 4	39.5	45 3	1.1	25.3	91	0.5	2	10	8	9	9	14	13	26	4	0	R	3	6.0	13	0	0
April	41.55	68.0	1.2	18.8	48.8	52.0	25.2	41.2	94	0.3	2	8	3	5	10	11	14	21	18	0	4.80	6	*	3	0	0
May	56.47	90.7	26.3	31.8	52.7	65.8	33.5	55.3	87	0.2	2	7	0	9	7	24	14	26	6	0	4.55	5	1.0	1	0	1
June	62.61	89.7	31.0	26.9	41.7	73.8	47.2	60.0	86	0.3	2	6	0	5	12	20	26	16	5	0	6.70	8	....	..	0	3
July	60.53	92.0	35.0	27.5	45.7	72.0	50.2	58.4	88	0.4	2	7	2	6	0	12	23	15	34	0	10.00	12	....	..	0	4
August	64.27	97.7	37.0	30.0	43.0	79.1	52.7	61.7	87	0.3	1	4	0	1	5	21	29	23	10	0	2.50	8	....	..	1	3
September	51.16	78.0	34.0	28.1	39 0	57.0	44.7	50.5	92	0.5	2	9	1	1	1	6	24	23	25	0	11.20	12	....	..	1	2
October	44.91	75.2	24.0	27.7	37.0	60.0	27.0	44.0	94	0 5	2	10	8	3	3	24	9	21	15	0	4.80	12	3.0	3	0	2
November	18.85	48.0	—17.1	19.1	31.5	36.0	—6.8	.....	91	0.4	1	28	4	2	0	17	11	14	14	0	0.00	0	7.6	5	0	0
December	9 36	45.0	—8.3	16.1	42.0	40.8	—4.2	.....	90	0.5	2	32	2	1	0	18	10	14	16	0	3.70	3	9.6	7	0	0
	°	°	°	°	°	°	°																			
	36.23	97.7	—32.5	22.75	52.7	79.1	—20.8	.....	89	0.4	1.8	161	31	42	53	190	204	249	162	0	48.25	69	55.7	48	2	15
		5th Aug.	28th Feb.			5th Aug.	2nd Feb.																			

FARM LANDS OF THE PROVINCE.

Rural Area Assessed. The following table shows the acreage assessed in townships which are municipally organised, the total for the province being given for all classes of land in 1890 and 1891. The acreage assessed and the number of acres of woodland and swamp and waste land are also given by county groups for 1890, while the acreage cleared is given by groups for both 1890 and 1891 :

Districts.	Acres assessed.			Acres cleared.		Acres woodland.	Acres swamp mar-h or waste.	Per cent. cleared.
	Resident.	Non-resident.	Total.	1891.	1890.			
Lake Erie.	2,275,536	53,702	2,329,238	1,411,160	1,397,825	816,678	101,440	60.6
Lake Huron.....	2,221,126	51,790	2,272,916	1,353,225	1,328,701	698,436	221,255	59.5
Georgian Bay....	1,941,017	78,795	2,019,812	1,065,043	1,041,859	750,835	203,934	52.7
West Midland...	3,216,060	35,831	3,251,891	2,315,034	2,293,009	631,753	305,101	71.2
Lake Ontario....	3,000,516	42,990	3,043,506	2,305,834	2,300,619	501,397	235,275	75.8
St. Law. & Ottawa	5,032,020	275,804	5,307,824	2,342,351	2,301,436	2,197,733	767,740	44.1
East Midland....	2,512,690	139,639	2,652,329	843,948	839,472	1,443,032	365,349	31.8
North'n Districts.	1,390,597	267,870	1,658,467	164,892	155,778	1,336,938	156,637	9.9
The Province. 1891..	21,589,562	946,421	22,535,983	11,802,487	....	8,376,762	2,356,734	52.4
The Province. 1890..	21,455,126	963,155	22,418,281	....	11,658,699	8,343,447	2,416,135	52.0

The rural area of the province assessed in 1891 was 22,535,983 acres, being an increase of 117,702 over the previous year, notwithstanding a decrease of 16,734 in the number of acres of non-resident land. 52 per cent., or a trifle over half, is cleared, an increase of area in this respect being observed in every district. The increase in the acreage of woodland is mainly due to the addition of newly organised districts. There is a slight decrease in the area of waste and swamp land.

Area in Pasture. The subjoined table gives the number of acres in pasture by county groups and for the province in each of the five years 1887-91, and also the percentage of cleared land in pasture in 1891 :

Year.	Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.
1891.....	269,189	381,578	234,623	530,858	379,627	693,923	201,289	30,194	2,721,281
1890.	246,107	339,984	214,561	513,612	369,063	641,597	195,303	21,865	2,542,092
1889....	249,623	319,428	221,087	511,618	410,416	685,401	191,194	19,195	2,607,962
1888.....	239,330	307,879	213,925	504,840	406,620	665,139	179,823	18,048	2,535,604
1887.....	240,586	296,316	204,903	512,349	404,893	667,034	186,850	16,008	2,528,939
Per cent, of cleared land in 1891	19.1	28.2	22.0	22.9	16.5	29.6	23.9	18.3	23.0

The acreage of pasture land is now 2,721,281, which is 179,189 acres more than in the previous year, there being an increased area of pasture in every group. The St. Lawrence and Ottawa group still maintain its lead, these fine dairying counties having a percentage of 26.6 acres of the cleared land in pasture. The Lake Huron counties come next. The Lake Ontario group falls below all the others in the number of acres in pasture to the 100 acres cleared.

Area in Crops. The number of acres under staple field crops is given in the appended table for each of the five years 1887-91, together with the averages for the past six and ten years respectively. The column for 1885–91 is given so as to keep the table uniform with that showing values in Part III :

Field Crops.	1891.	1890.	1889.	1888.	1887.	1885-91.	1882-91.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.
Fall wheat	849,956	720,101	822,115	826,537	897,743	839,713	902,846
Spring wheat	510,634	651,753	398,610	367,850	484,821	534,371	563,547
Barley	553,166	701,326	875,286	895,132	767,346	732,315	743,245
Oats	1,840,636	1,882,366	1,923,444	1,849,868	1,682,463	1,763,489	1,663,205
Rye	67,865	103,061	99,106	84,087	68,362	79,936	103,636
Peas	752,453	781,206	708,068	696,653	726,756	716,450	668,962
Corn	241,086	223,836	187,116	222,971	163,893	194,747	195,878
Buckwheat	107,879	90,111	56,398	57,528	64,143	72,661	69,230
Beans	41,451	39,456	21,830	22,700	20,275	27,348	26,201
Potatoes	160,218	158,094	145,812	153,915	140,283	151,172	155,449
Mangel wurzel	22,961	25,953	21,211	21,459	17,924	20,588	19,516
Carrots	9,858	11,977	11,261	11,524	9,110	10,289	10,423
Turnips	126,075	111,955	111,103	113,188	105,322	109,711	104,913
Hay and clover	2,549,975	2,462,002	2,386,223	2,292,638	2,280,643	2,362,103	2,290,495
Total	7,834,213	7,912,297	7,758,583	7,616,350	7,429,084	7,614,893	7,517,606

The total acreage in field crops is 7,834,213, being 78,084 acres less than in the previous year, but more than in any other year of the table. Fall wheat had a larger area than in any year since 1887, but spring wheat falls below its record of 1890. Barley, oats, rye and peas also show a decrease in their respective acreages compared with the previous year, while corn, buckwheat and beans exhibit a decided increase. Of the root crops potatoes and turnips have a wider area than in any other year, while mangels and carrots fall below their acreages of 1890. Hay and clover has the largest area of any year on record. The areas of fall and spring wheat, barley, rye and carrots fall below their respective averages for the ten years, but all the others show an increase.

The following table gives the acreage by county groups and for the province, of all the crops mentioned in the preceding table, and for the same periods :

Year.	Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.
1891	990,197	844,278	696,561	1,504,482	1,635,753	1,463,449	571,755	127,738	7,834,213
1890	996,955	851,934	696,361	1,539,165	1,669,314	1,474,437	569,117	115,014	7,912,297
1889	949,859	812,757	719,473	1,481,308	1,667,961	1,450,900	582,343	93,962	7,758,583
1888	958,486	801,218	690,243	1,489,263	1,635,315	1,402,502	551,102	88,221	7,616,350
1887	932,076	781,833	656,184	1,455,376	1,609,981	1,371,322	539,460	82,852	7,429,084
Average —									
1885-91	952,513	803,837	678,956	1,477,630	1,627,625	1,418,107	560,172	96,053	7,614,893
1882-91	933,772	787,088	669,133	1,464,600	1,616,760	1,397,819	558,133	90,301	7,517,606

A slight increase is noticed in the Georgian Bay and East Midland groups and in the Northern Districts compared with the previous year, but the five other groups exhibit a decrease. All of the districts however exceed their respective acreages of both the seven and ten years periods.

PROPORTIONAL AREAS UNDER CROP. The following table shows the relative distribution of the various crops per 1,000 acres cleared, by county groups and for the province, in 1890 and 1891, together with the average for the ten years 1882-1891:

Districts.		Fall Wheat.	Spring Wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buckwheat.	Beans.	Hay and Clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.	Total.
Lake Erie.	1891	163.9	9.5	23.9	122.1	5.4	46 7	71.6	9.9	23.2	211.4	10.3	1.3	.6	1.9	701.7
	1890	138.6	16.8	33.7	132.9	10.0	60.2	71.5	8.6	21.7	205.0	10.5	1.2	.7	1.8	713.2
	'82-91	169.9	9.5	29.4	127.1	8.8	47 3	72.5	8.1	13.8	211.2	12.2	1.0	.5	1.7	713.0
Lake Huron	1891	97.6	21.7	33.7	154.9	.8	72.7	11.3	1.4	.8	205.1	9.9	2.1	.7	11.2	623.9
	1890	81.1	22.8	49.9	168.4	1.3	79.0	10.2	1.8	.6	203.7	9.6	2.5	.8	9.5	641.2
	'82-91	119.4	29.3	49.7	151.5	.8	68.1	8.8	1.0	.5	196.0	10.6	2.0	.8	10.6	649.1
Georgian Bay	1891	69.5	51.1	37.7	167.1	2.2	85.6	2.9	1.5	.3	206.2	14 0	.8	.8	14.3	654.0
	1890	64.0	67.7	44.5	170.5	3.9	82.6	3.2	1.5	.4	201.4	13.6	1.2	1.1	12.8	668.4
	'82-91	80.7	74.3	53.1	158.0	2.9	80.4	1.7	.8	.2	196 9	14.0	1.0	1.1	12.8	677.9
West Midland.	1891	98.4	29.7	49.5	167.3	1.2	67.0	14.4	1.2	.3	188.3	11.6	3.6	.8	16 6	649.9
	1890	84.9	31 4	62.0	177.5	2.5	74.5	14.7	1.3	.4	189.1	12.1	3.9	1.1	15.8	671.2
	'82-91	115.2	35.3	60.0	156.6	2.2	62.6	13.1	1.1	.5	186.7	12.2	2.9	1.0	15.9	665.3
Lake Ontario.	1891	65.2	70.0	88.3	140.4	9.2	77.8	15.7	15.1	.8	192 9	14.5	2.1	.8	16.3	709.1
	1890	53.5	85.0	111.6	142.2	12.3	78.8	15.1	11.9	1.1	181.5	14.6	2.6	1.3	14.1	725.6
	'82-91	70.8	73.8	127.2	129.1	14.1	68.6	13.6	8.2	.9	182.6	14.2	2.3	1.2	13.3	719.9
St. Lawrence and Ottawa.	1891	5.2	45.1	28.0	175.0	9.1	38.7	17.3	15.7	1.8	267.6	17.1	.9	.9	2.4	624.8
	1890	4.3	54.6	34.6	178.8	12.9	37.2	12.5	14.5	1.6	268.7	16.7	1.1	.9	2.3	640.7
	'82-91	7.4	53.3	42.4	176.2	15.0	42.4	9.7	13.1	1.5	256.6	17.8	.8	.7	1.9	638.8
East Midland.	1891	25.8	83.4	56.1	155.0	12.9	67.1	12.9	17.6	.7	218.4	14.9	2.2	1.0	9.5	677 5
	1890	27.7	91.5	72.4	146.4	22.5	66.8	11.4	11.2	.9	200.8	15.1	2.7	1.2	7.3	677 9
	'82-91	33.5	91.9	99.5	146.7	22.4	61.7	9.4	8.1	.7	195.2	15.4	1.6	1.0	7.3	697.4
Northern Districts.	1891	3.6	41.0	14.9	175.9	4.9	91.9	3.2	8.0	.9	379.2	27.3	.4	1.7	21.8	774.7
	1890	5.8	47.8	14.3	171.7	5.8	78.4	2.5	6.3	.7	363.9	25.7	.3	1.2	13.9	738.3
	'82-91	4.7	72.2	15.7	164.9	7.8	74.6	3.0	5 1	.7	364.3	25.8	.7	1.3	18.7	759.5
The Province	1891	72.0	43.3	46.9	156.0	5.7	63 8	20.4	9.1	3.5	216.1	13.6	1.9	.8	10.7	663.8
	1890	61.8	51.6	60.2	161.5	8.8	67.0	19.2	7.7	3.4	211.2	13.6	2.2	1.0	9.5	678.7
	'82-91	81.6	50.9	67.2	150.3	9.1	60.5	17.7	6.3	2.4	207.0	14.0	1.8	.9	9.5	679.5

For every 1,000 acres cleared in the province there are 663.8 under the crops named in the table. This is a decrease of 14 9 acres per 1,000 compared with the figures of the previous year, and is 15.7 acres per 1,000 less than the average for the ten years. The Northern Districts were the only group that equalled its own figures either for the previous year or for the 1882-91 period. Fall wheat, corn, buckwheat, beans, hay and clover and turnips show an increase compared with the previous year, but all the other crops reveal a decline, excepting potatoes, which had no change of figures. The Lake Erie counties have the largest proportional area under fall wheat, corn and beans. The West Midland group leads in mangel-wurzels and the Lake Ontario group in barley. The East Midland counties head the record for spring wheat, rye and buckwheat, but the Northern Districts have the largest proportional area for the following six crops: Oats, peas, hay and clover, potatoes, carrots and turnips.

FALL WHEAT.

The bulletin issued in November, 1890, stated that there had been a considerable increase in acreage, and that the condition of the ground at the time of sowing, except on clay land which was rather dry and stiff, was most suitable for a good start. The general appearance of the fields as correspondents wrote was such as to evoke frequent expressions of admiration. The chief cause for fear lay in the fact that the plant had made rather too rank a growth. Scattering mention was made of injury by the Hessian fly on early sown fields, and the wire-worm and white grub were reported in a few localities, but the prevailing opinion was that a better outlook for the new crop of fall wheat had never been reported during the first week of November.

The May bulletin had the following regarding the crop: "The reports from the western parts of the province, where most of the fall wheat is grown, are remarkably unanimous, and are very cheerful in tone. Excepting on undrained and "springy" land little damage was done by ice, and only here and there along the fences was there anything in the shape of smothering out by snow. In the Lake Erie and Lake Huron districts especially a number of correspondents are positively enthusiastic in their expressions of admiration of the present condition of the crop, the most promising, it is claimed, observed for many a year. In the four western districts no mention is made by correspondents of fall wheat having been plowed up The reports from the eastern half of the province are not so favorable. The crop was thinned considerably on heavy land, and low lying fields suffered from ice. A considerable area is described as very 'patchy' in Durham, Northumberland, Prince Edward, Frontenac, Leeds and Grenville, Dundas and Victoria, and in the three Lake Ontario counties named from 10 to 25 per cent. is reported by some correspondents as having been plowed up in their immediate neighborhoods. Some of these writers, however, console themselves with the reflection that 'a half crop of fall wheat is as good as a full crop of spring wheat.' Scattering mention only is made of injury by insect pests. A Kent correspondent reports the crop as having been thinned on old soil by the wire-worm, and a Lambton correspondent also speaks of its presence. Odd mention is made of the Hessian fly in Elgin, Lambton, Huron and Simcoe, but the great majority of correspondents rejoice over the fact that the crop is free from injury by worm or fly."

The August bulletin stated that the bright expectations of spring had been fully realised, and that in the three points of yield, quality and housing the crop had an enviable record. In western Ontario the yield in most cases had been magnificent, ranging all the way from 15 to 55 bushels per acre. In the eastern part of the province, especially in those counties stretching from Durham to Stormont, a light yield was the rule, sometimes falling as low as 8 bushels to the acre, although even here some correspondents rejoiced in a yield of 30 bushels per acre. The average yield for the province was then estimated at 24.4 bushels to the acre. Nearly every correspondent had a favorable word to say regarding the plumpness and general quality of the berry, and instances were given of the grain weighing 63, 64 and 65 lb. per bushel. The straw was thin on the ground and was much shorter than usual, owing to cold weather and drouth during May and June, but the quality was reported as good. There was hardly any rust, and smut was spoken of in but two or three instances. Scarcely any mention was made of injury by insects, except scattering complaints about the Hessian fly from Essex, Welland, Lambton and Peterborough, and an odd reference to grasshoppers. Cutting began in Essex on the 6th of July but was hardly general throughout the province until the second last week of the month. The crop was got into the barn with little or no injury.

The November bulletin thus alluded to the crop: Fall wheat has turned out a remarkably fine crop—better than expected. It is undoubtedly the crop of the year. It averages 25 to 30 bushels per acre in many sections and weighs from 60 to 66 lb. per bushel, in many townships averaging 64 lb. Out of all our correspondence only 14 reports of an inferior crop have been received, 10 of which come from the east which produces less than one-fifth of the entire output. The following table gives the acreage

and yield by country groups and for the province in each of the years 1890 and 1891, together with the yearly average for the ten years 1882-91 :

Districts.	1891.			1890.			Yearly average for the ten years 1882 91.		
	Acres.	Bushels.	Bush. per Acre.	Acres.	Bushels	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie.....	231,292	5,940,500	25.7	193,716	3,635,817	18.8	222,484	4,269,869	19.2
Lake Huron.....	132,026	3,536,347	26.8	107,765	2,247,001	20.9	144,826	2,896,824	20.0
Georgian Bay	73,973	1,839,186	24.9	66,705	1,206,527	18.1	79,606	1,644,427	20 7
West Midland.	227,652	6,405,516	28.1	194,682	4,289,221	22.0	253,471	5,191,035	20.5
Lake Ontario.....	150,465	3,515,869	23.4	123,101	2,308,261	18.8	158,983	3,236,886	20.4
St. Law. and Ottawa.	12,195	214,109	17.6	9,952	159,925	16.1	16,108	287,877	17.9
East Midland	21,753	407,012	18.7	23,276	404,429	17.4	26,809	521,448	19.5
Northern Districts...	600	13,949	23 2	904	16,202	17.9	559	10,869	19.4
Totals.....	849,956	21,872,488	25.7	720,101	14,267,383	19.8	902,846	18,059,235	20.0

The acreage of fall wheat in 1891 is larger by 129,855 than that of the previous year, although still below the average for the ten years 1882–91. A shrinkage is observed in the areas devoted to this grain in the East Midland and Northern Districts, but in every other group a decided increase is noticed in the breadth grown. The only group (excepting the newly settled Northern Districts) showing an increased acreage over its average for the ten years, however, is the Lake Erie district, which leads the West Midland counties this year in the matter of the largest area of fall wheat. The average yield per acre for the province for the year is 25.7 bushels, being 5.9 bushels more than in 1890, and 5.7 bushels above the average for the ten years. The West Midland group averaged 28.1 bushels per acre, while the yield in the St. Lawrence and Ottawa counties averaged only 17.6 bushels. The total yield of the province for the year is 21,872,488 bushels, which is over 50 per cent. greater than that of 1890, and 3,813,253 more than the average for the ten years.

The New Crop of Fall Wheat. The acreage of fall wheat sown in 1891 is at least 15 per cent. greater than that sown in 1890, the increase being entirely in the western part of the province. The reasons assigned by correspondents for this increase are the following : The extraordinary fine results of the crop this year, the low price of barley the past summer, and the very favorable weather of September for sowing. Most of the land which had been specially prepared for fall wheat was in good condition, but a great deal of land has been put down to this crop that is dirty and poorly prepared as a consequence of the increased acreage. On the whole the condition of the land at sowing may be termed "fair." Sowing commenced in the latter part of August and continued up to the end of October, but most of it was done from the 5th to the 20th of September. The early sown made rapid growth, became too rank if anything, and in many sections now shows very yellow and appears in very poor form. The late sown came up very slowly and unevenly owing to the dry weather. The general condition at present is hardly equal to that reported in 1890. Wire-worm and rust are reported from a few sections, but not enough as yet to cause any alarm. The reports of Hessian fly are far more numerous, but in all cases the reason assigned is the yellowing of the crop which may be due to other causes. No one reports any direct evidence of the presence of the fly, and many reports are worded thus : "Early sown is yellowing, supposed to be due to the Hessian fly, but have not been able to find any." The varieties principally sown are the follow-

ing: Clawson (the favorite of the province) Democrat and Manchester in many districts; Hybrid-Mediterranean and Surprise in one or two districts, and small sowings of Canadian Velvet Chaff all over the west. A great many new varieties are being tested.

SPRING WHEAT.

Owing to the early part of April being wet, spring work was crowded into the latter part of the month, which was exceedingly fine and dry. Seeding was pushed forward in the west with vigor, and spring wheat was nearly all in by the 1st of May; but in the eastern part of the province the work was more backward.

The reports regarding the crop, made under date of August 8th, were generally of a most favorable character. Only a few fields of spring wheat had been cut, however, and harvesting was not expected to be general for about a week. The bulletin thus summarised the returns: "The crop will go considerably over the average in yield, and a plump and clean berry is assured. Casual mention only is made of rust or smut, and the Hessian fly has been heard of but rarely. The midge is spoken of in Grey, York, Durham and Renfrew, but only in a single instance in each county. One Victoria correspondent complains of damage by a green louse, and another reports the weevil as at work. It can be safely said, however, that it is many a year since so large a yield of spring wheat so generally free from injury from any cause has been reported upon. White Russian appears to be the most popular variety, while Colorado comes a good second. In the west Goose is in much favor, while all over the province the old white and red Fyfes are still largely grown. The names of other favorite kinds of spring wheat as given by correspondents would make a lengthy catalogue."

The November bulletin had the following: Spring wheat is grown principally in Eastern Ontario, and with very few exceptions is said to be a very fine crop. We have received many such reports as these: "Best crop in ten years." "Best crop in twenty years." "Best ever known." The table following gives the acreage and yield for 1890 and 1891, together with the average for the last ten years:

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush per acre.	Acres.	Bushels	Bush per acre.	Acres.	Bushels.	Bush per acre.
Lake Erie	13,411	221,758	16.5	23,548	310,647	13.2	12,520	185,396	14.8
Lake Huron.....	29,413	610,312	20.7	30,245	469,332	15.5	35,577	512,455	14.4
Georgian Bay	54,568	1,071,181	19.6	70,508	934,079	13.2	73,323	1,090,219	14.9
West Midland.....	68,786	1,514,049	22.0	72,049	1,192,801	16 6	77,674	1,199,067	15.4
Lake Ontario.....	161,574	3,356,283	20.8	195,498	2,323,621	11.9	165,693	2,710,299	16.4
St. Law. and Ottawa.	105,704	2,494,112	23.6	125,660	1,407,723	11.2	116,614	1,945,087	16.7
East Midland	70,409	1,307,802	18.6	76,801	936,894	12.2	73,556	1,084,864	14.7
Northern Districts....	6,769	136,041	20.1	7,444	108,808	14.6	8,590	155,611	18.1
Totals.	510,634	10,711,538	21.0	601,753	7,683,905	12.8	563,547	8,882,998	15.8

A falling off in the acreage of fall wheat in every group leaves the total area only 510,634 acres compared with 601,753 in the previous year. The unusual yield of 21.0 bushels per acre, compared with 18 8 in 1890 and an average of 15.8 for the ten years, makes the total yield for the province a large one, despite the contracted area, the figures being 10,711,538 bushels in 1891 as against 7,683,905 in the previous year and an average of 8,832 998 for the ten years. The magnificent average yield of 23.6 bushels per acre was experienced in the St. Lawrence and Ottawa counties, while the smallest average yield was that of the Lake Erie group, being 16.5 bushels; but even this latter was .7 bushels more than the average of the province for the ten years.

BARLEY.

The spring returns were unanimous in reporting a shrinking acreage. The great barley growing counties running from Wellington to Prince Edward, especially experienced a falling off in the area given to the crop. Some correspondents placed the shrinkage in their respective localities as high as 35 and even 50 per cent., but the average for the province is about 21 per cent., or some 148,160 acres. The causes generally assigned for the reduced acreage were the McKinley Bill and the uncertainty of the markets.

The August bulletin had the following concerning barley: "Corresponden's do not agree concerning this crop. In some localities it is reported as all cut and under cover, while in other places reaping had just started. In the case of two-rowed barley, however, little if any had been cut. While in several localities the crop appears to have suffered discoloration from wet weather, it is pleasing to know that the greater part of the cut was got into the barn untouched by rain and is of good color. Much difference of opinion is manifested by correspondents as to the benefits of growing the two-rowed barley. Some who have experimented with the samples sent out by the Ottawa Government are delighted with the result, while others speak very slightingly of the new barley as compared with the old six-rowed. It is worthy of notice that while much of the six-rowed barley was cut and housed as correspondents wrote, a week or two more was needed to ripen the two-rowed variety. But while later the two-rowed sort this year gives promise of a greater yield than its six-rowed competitor. A comparison of quality cannot be given until threshing and marketing settle the dispute."

The following appeared in the November bulletin: "In regard to barley the acreage sown is becoming less, and reports are variable. The drouth retarded its early growth, and the wet weather at harvest affected its quality. The yield appears to be good, but the grain in the great majority of cases is badly colored. In regard to two-rowed barley the reports are divided. All agree that the past season has been exceptionally favorable for this crop. The correspondents speak only of the yield per acre and weight per bushel, nothing being mentioned, of course, as to its malting qualities. From Essex to Welland the reports are decidedly against it; from Lambton, Huron, Bruce, Grey and Simcoe the reports are slightly in favor; the central counties in the west give strong opinions on both sides; from Toronto through the Whitby and Bay of Quinte regions and in the vicinity of Ottawa more favorable reports have been received; in Victoria, Peterborough and the region to the north the majority of the opinions are against it." The table ensuing shows the acreage and yield for 1890 and 1891, and also the average for the ten years 1882-91:

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.
Lake Erie	33,771	856,901	25.4	47,045	966,480	20.5	38,514	949,150	24.6
Lake Huron	45,633	1,325,143	29.0	66,347	1,613,851	24.3	60,269	1,611,737	26.7
Georgian Bay	40,124	1,183,350	29.5	46,358	1,119,210	24.1	52,453	1,340,823	25.6
West Midland	114,653	3,543,512	30.9	142,206	3,806,364	24.8	132,079	3,766,110	28.5
Lake Ontario	203,705	5,859,191	28.8	256,753	5,268,439	20.5	285,669	7,459,220	26.1
St. Law. and Ottawa	65,491	1,970,465	30.1	79,616	1,569,872	19.7	92,780	2,259,937	24.4
East Midland	47,333	1,341,597	28.3	60,772	1,208,642	19.9	79,617	1,918,291	24.1
Northern Districts	2,456	61,745	25.1	2,220	47,311	21.2	1,864	44,083	23.6
Totals	553,166	16,141,904	29.2	701,326	15,600,169	22.2	743,245	19,349,351	26.0

The heavy falling off in the acreage of barley is a striking feature of the table. The area in 1891 is only 553,156 acres, compared with 701,326 in 1890, which means a

shrinkage of 148,160 acres, or fully 2½ per cent., in a single year. This falling off in acreage has been very general, a decrease being noticed in every group except the Northern Districts, where the acreage of barley is unimportant. The splendid average yield of 29.2 bushels per acre, however, has put the total amount raised a good half million bushels more than that of 1890, although it falls below the average for the ten years by over three million bushels. The West Midland group went nearly 40 bushels per acre, and St. Lawrence and Ottawa counties averaged over 30 bushels, and only two out of the eight districts fell below the provincial average for the ten years.

OATS.

The August bulletin stated that the reports regarding this crop were favorable on the whole. Only a small portion of the crop had been cut as correspondents wrote, but an excellent yield was anticipated. The most hopeful reports came from the counties lying between Peel and the Ottawa river. The straw was described as short but clean, and while standing thin upon the ground it carried long heads well filled. On certain soils the seed had started unevenly owing to the drouth, and a corresponding unevenness was experienced in ripening. Rust was reported in but very few instances, and there was only the barest mention of smut. "Indeed," ran the summary, "the crop may be said to have had almost complete immunity from every form of blight or pest, and although considerably lodged in many quarters by the heavy rain storms of the 8th and 9th of the present month no serious trouble is feared beyond additional work in harvesting the crop."

According to the November reports oats were a variable crop, failure and extraordinary yields being reported from adjacent townships. In the west early sown were reported good, and late sown light. In the inland central district and in the east the yield was above the average. In many sections the wet weather before harvest induced rust, and the rains at harvest prevented getting the crop in in good shape. On the whole the crop is far above the average. The following table has the acreage and yield for each of the years 1890 and 1891, together with the average for the ten years 1882-91 :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie.....	172,276	6,570,071	38.1	185,806	4,429,838	23.8	166,426	5,946,680	35.7
Lake Huron....	209,600	8,462,066	40.4	223,749	6,507,605	29.1	183,681	6,504,471	35.4
Georgian Bay ..	177,988	6,777,596	38.1	177,625	5,320,863	30.0	155,946	5,175,195	33.2
West Midland..	387,307	17,075,815	44.1	406,897	12,618,834	31.0	344,814	13,187,993	38.2
Lake Ontario...	323,775	13,700,031	42.3	327,206	9,215,067	28.2	289,895	10,618,915	36.6
St. L. & Ottawa	409,849	16,804,660	41.0	411,408	10,530,752	25.6	385,470	12,659,140	32.8
East Midland ..	130,844	4,735,777	36.2	122,936	3,428,369	27.9	117,364	3,713,084	31.6
Nor'n Districts.	28,997	883,526	30.5	26,739	716,879	26.8	19,606	605,125	30.9
Totals	1,840,636	75,009,542	40.8	1,882,366	52,768,207	28.0	1,663,205	58,410,603	35.1

The total acreage in 1891 is 41,730 below that of the previous year, but the remarkably good average yield of 40.8 bushels per acre makes the total yield of the province 22,241,335 bushels more than in 1890. The average yield per acre for the ten years falls short of that of 1891 by 5.7 bushels, and the average total yield for the same period is 16,598,939 bushels less than that of the present year. The Georgian Bay and East Midland groups and the Northern Districts show an increased area compared with the

previous year, but every district exceeds its own total yield of 1891 and its average total yield for the period 1882-91. The West Midland counties have the magnificent average yield of 44.1 bushels per acre to their credit, while the Northern Districts are the only group falling below the average yield per acre of the province for the ten years.

RYE.

This crop, never a large one, is not increasing in popularity. Correspondents in the eastern part of the province, particularly in Northumberland, Prince Edward and a few counties further east, report the crop as still being raised, but in the west it is now comparatively unknown except as a green feed for May and June. As correspondents wrote early in August rye was said to be in fair condition, more particularly where sown on high land. The November bulletin stated that the yield would be medium, but the crop is grown only in small quantities, and correspondents had but little to say regarding quality and general condition. The average and yield for 1890 and 1891, together with the average for the ten years 1882-91, is given in the following table:

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie.....	7,613	132,517	17.4	13,994	201,896	14.4	11,571	180,395	15.6
Lake Huron ..	1.060	19,940	18.8	1,732	32,648	18.8	987	17,561	17.8
Georgian Bay ..	2,346	43,510	18.5	4,069	61,822	15.2	2,887	51,693	17.9
West Midland.	2,636	50,828	19.3	5,649	93,785	16.6	4,863	80,631	16.6
Lake Ontario...	21.254	315,752	14.9	28,273	386,172	13.7	31,576	466,309	14.8
St. L'w & Ottawa	21,288	386,831	18.2	29,576	475,333	16.1	32,930	589,022	17.9
East Midland ..	10,865	169,546	15.6	18,858	294,881	15.6	17,899	279,775	15.6
Nor'n. Districts	803	15,706	19.6	910	16,808	18.5	923	17,825	19.3
Totals	67,865	1,134,630	16.7	103,061	1,563,345	15.2	103,636	1,683,211	16.2

The acreage of rye continues to decrease. Every district shows a smaller area than in the previous year, and the total acreage of the province is now only 67,865, or 35,196 less than that of 1890. The average yield per acre is 16.7 bushels, being 1.5 bushel more than in 1890 and .5 bushel above the average of the province for the ten years. The growth of rye is confined mainly to the last three districts named in the table, and is a minor crop even there It is well to remember that all the rye is not threshed, as the table might lead some to suppose. Much of it is feed green, but in that case the stock get the benefit of both head and stalk, even though the plant may not be fully matured.

PEAS.

According to the August bulletin the reports then to hand indicated an exceptionally good pea crop throughout the province. But little had been harvested when correspondents wrote, except in some eastern sections, where the early varieties for seed had been secured in excellent condition. In the Lake Erie district the crop was again injured by drouth in the early summer and by bugs later on. In the east, however, the bug is now practically a stranger. The June drouth left its effects more or less on all parts of the province, especially in the Lake Huron counties, though much of the threatened

danger was averted by rains later on, and it may be said that peas suffered less than any other crop from drouth. In a few eastern points some signs of mildew were reported, but the comparative damage will be slight.

The November bulletin said that in some sections peas ripened unevenly. A larger crop would have been harvested had it not been for the ravages of the "pea-bug." The injuries were principally in Essex, Kent, Lambton and Middlesex. On the whole the crop may be regarded as a good one, although the straw will be very poor owing to wet weather. The table following shows the acreage and yield for 1890 and 1891, and also the average for the ten years 1882-91 :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per Acre.	Acres.	Bushels.	Bush. per Acre.	Acres.	Bushels.	Bush. per Acre.
Lake Erie.....	65,934	1,309,973	19.9	84,196	1,262,693	15.0	61,909	1,152,512	18 6
Lake Huron.....	98,334	2,599,112	26.4	104,950	2,223,672	21.2	82,523	1,846,907	22.4
Georgian Bay.....	91,163	2,297,147	25.2	86,074	1,868,911	21.7	79,335	1,731,236	21.8
West Midland.....	155,149	3,976,675	25.6	170,901	3,284,924	19 2	137,761	2,998,574	21.8
Lake Ontario...	179,439	4,181,917	23.3	181,216	3,538,243	19.5	154,091	3,115,844	20.2
St. Law. and Ottawa.	90,627	2,253,956	24.9	85,596	1,717,316	20.1	92,717	1,847,810	19.9
East Midland.....	56,660	1,334,226	23.5	56,064	1,223,871	21.8	51,752	1,009,842	19.5
Northern Districts....	15,147	370,453	24.5	12,209	269,683	22.1	8,87 1	205,903	23.2
Totals.....	752,453	18,323,459	24.4	781,206	15,389,313	19.7	668,962	13,908,658	20.8

An increase is observed in the area covered by peas in the Georgian Bay, St. Lawrence and Ottawa and East Midland groups, as well as in the Northern Districts, but the decrease in the other four groups makes the total number of acres given to the crop in the province fall 28,753 below the figures for the previous year. Notwithstanding this decrease in area, however, the capital average yield of 24.4 bushels per acre, compared with 19 7 bushels in 1890 has sent the total yield of the province about three million bushels ahead of last year's record. The St. Lawrence and Ottawa is the only group exhibiting a decreased area compared with its own average area for the ten years. The Lake Huron counties average 26.4 bushels per acre, and the Lake Erie group was the only one which fell below the average of the province for the ten years.

INDIAN CORN.

Owing to the drouth at the time of planting a considerable portion of the seed did not germinate, and the crop generally made so late a start that several correspondents expressed the fear in their August reports that frost might yet injure the growing crop. The bulletin for that month had the following regarding corn : "Although the hills were thinned by the drouth in most localities, very encouraging reports come from the counties along the St. Lawrence where corn is being more grown for the ear than formerly. In the great corn raising counties along Lake Erie, however, the tone of the returns is not so encouraging. Where grown for shelling, corn is chiefly raised in hills, but for soiling (where pastures are poor) or for the silo the drill is generally used. Very little is now sown broadcast. The question of the best corn for Ontario is not yet settled. In the Lake Erie district the eight-rowed yellow appears to be most in favor, while the yellow and white Flints and Dents are also popular. For the eastern Ontario silos the Mammoth Southern Sweet, Horsetooth and Crompton's Early are most in demand. A score or more other varieties, however, have pronounced admirers amongst our corres-

pondents." Except where sown broadcast for soiling purposes, corn is generally planted in drills or in hills about four feet apart each way, so as to admit of thorough cultivation. Three or four stalks are usually grown in each hill.

According to the November bulletin corn was not by any means a uniform crop in the southwestern counties, where it is chiefly grown. On heavy clay soils the crop in many instances failed on account of the dry and backward spring and, again, on light and sandy soils it suffered very much from summer drouth. In that district, as might be expected under the circumstances, corn proved on the whole to be rather short in the stalk and light in the ear, but at the same time the sample was hard and well matured in both early and late varieties, and uninjured by frost. Corn, where raised for soiling or for winter feed, has been an enormous crop. The past season has proven the wisdom of having a crop such as corn to supplement short pastures in dry seasons. The accompanying table gives the acreage and yield in 1890 and 1891, and also the average for the years 1882-91. In considering the table, however, it will be well to bear in mind that while the total yield in every case is estimated on the whole area grown, all of the crop is not allowed to mature, and therefore the quantity of corn actually husked must fall considerably below the figures credited to the various total yields. In the Lake Erie counties most of the corn grown gets into the crib, and in portions of the Lake Huron, West Midland, Lake Ontario and St. Lawrence and Ottawa groups a fair proportion of the crop matures, but much of the corn sown is intended for soiling, and it makes excellent green fodder to supplement dry pastures. There is also an increasing quantity of corn raised for the silo, in which case the ears are fed to cattle in the form of ensilage. The actual yield of husked corn can therefore be safely placed at from three to four millions of bushels less than the table gives for the province.

Districts.	1891.			1890.			*Yearly average for the nine years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	101,037	7,691,736	76.1	99,914	6,696,013	67.0	94,647	6,647,266	70.2
Lake Huron	15,318	1,173,416	76.6	13,590	793,611	58.4	10,441	661,466	63.4
Georgian Bay	3,125	171,740	55.0	3,346	182,062	54.4	1,715	91,660	53.4
West Midland	33,377	2,719,167	81.5	33,590	2,092,447	62.3	28,096	1,880,286	66.9
Lake Ontario	36,251	2,628,817	72.5	34,692	1,948,478	56.2	29,609	1,794,039	60.6
St. Law. and Ottawa	40,570	3,153,380	77.7	28,764	1,792,316	62.3	21,570	1,323,342	61.4
East Midland	10,878	725,232	66.7	9,549	491,469	51.5	7,412	397,792	53.7
Northern Districts	530	25,171	47.5	391	14,785	37.8	348	14,465	41.6
Totals	241,086	18,288,659	75.9	223,836	14,011,181	62.6	193,838	12,810,314	66.1

The area of corn is 17,250 acres more than in 1890, which proves that the crop continues to grow in favor. A remarkable increase in the area is noticed in the dairying counties of the St. Lawrence and Ottawa group, while compared with 1890 there is a slight falling off in acreage in the Georgian Bay and West Midland districts. Every group except the Georgian Bay shows an increase in the total yield compared with its own record, and the high average of 75.9 bushels per acre for the province places the total yield for the year over four millions greater than that of 1890. The magnificent average yield of 81.5 bushels per acre is credited to the West Midland district. In the Georgian Bay group and the Northern Districts the average yield per acre fell below that of the province for the nine years, but every other group went well over it.

*On account of the destructive frost of 1883, no estimate was made of the yield of corn, buckwheat and beans in that year. That year has, therefore, been omitted in calculating the yearly average of those crops in this and following tables.

Remarks of Correspondents.

Cayuga, Haldimand: Fodder corn is coming in largely, but a great mistake is made by sowing it too thickly. Some sow nearly three bushels to the acre broadcast, instead of drilling it in one-half to three-quarter bushels per acre.

Plympton, Lambton: One silo has been put on trial this year, but very large quantities of corn have been sown for feed—chiefly Mammoth Southern Sweet—and it has grown splendidly. This has been fed as "soiling" during the summer, but an immense quantity has been cut and stooked, and is now standing in the field for winter use. My own practice this year is to fall back on our Canada Flint, white and yellow, and I am highly pleased with the yield. It has been remarked that our Canadian corn is remarkably well eared this year.

St. Vincent, Grey: There are a good many growing small patches of corn for fodder, but they are timid about trying the silo. There are a few silos filled with corn as directed by the bulletins and reports sent out by the Agricultural College. It was grown in drills three feet apart. Ours was Red Cob, Southern Sweet and Compton's Early. I think Compton's Early or some Canadian variety is better, as the American does not mature sufficiently in this locality to make sweet ensilage. Not having the silo built in time Compton's Early was too ripe and we mixed it. Many are interested and are watching closely the result.

Zorra E., Oxford: Four or five silos have been built in this township this year. They are filled with corn cut in two inch lengths. Mostly Yellow and Flint varieties are grown, being planted in rows 3½ feet apart and cut when the ears are glazed.

Crosby N., Leeds and Grenville: Western corn is a good deal grown here. It is cut with binders where practicable, but otherwise by hand with the sickle. It is dried properly and saved by standing the bound sheaves on end over the top of hay mows and straw mows. Several farmers around here have saved from twelve to twenty tons in this way, which would mean four times that weight if cut green and put into a silo. Where it can be saved properly in this way I, for one, would prefer to use it to the ensilage, and for the following reasons: 1. Less work. 2. Cows do just as well as on ensilage. 3. There is an equal amount of milk in each case. 4. You can feed dry western corn when you would not want to open the silo.

Asphodel, Peterborough: The first silo built in this county, as far as I know of, was built by me. Since then there have been a number erected, and they generally have proved satisfactory. The crop used for making ensilage is corn. Mammoth Southern Sweet or Giant Prolific Ensilage corn has given the best results. Sow the corn on well prepared ground with a drill in rows from thirty inches to three feet apart, and at the rate of about half a bushel to the acre. Run the cultivator through the corn as often as possible and cultivate shallow. The oftener the cultivator is run through the better the crop. When the corn begins to glaze in the ear it is fit to harvest. Cut and draw to the silo, put the corn through a straw cutter, cutting it in inch lengths, and place in silo, tramping well especially around the edges. When filled cover with a floating roof of boards, and cover the boards with about a foot of cut straw.

Watt, Muskoka: I had a small patch of sunflower this season. I have cut up the stalks and put them in the silo, and intend to crush the seed and see what my stock will make of it. If the results are favorable I intend to cultivate the sunflower as a silo crop. Corn is a very doubtful crop to raise with us unless we can get a more rapidly growing kind than I have met with.

The Silo. The August bulletin had the following regarding ensilage: "Notwithstanding the strong advocacy of ensilage by experienced men at the annual meetings of the Dairymen's and Creameries' Associations, and the issuing of several bulletins on the subject by this Department, the silo is not being rapidly adopted in this province. Several new silos are reported in Grey and three or four other western counties, and in the stretch of counties between Northumberland and the Ottawa a trial is being given the new process by enterprising men, but as one correspondent remarks, there is more talk than actual work done in the matter of building silos." The November bulletin thus dealt with corn for the silo: "Silos are increasing in sections where roots cannot be successfully grown and in dairy regions. From the east, especially Leeds and Grenville, Frontenac and a few other counties, reports of new silos are received. The crop for this purpose was sown entirely in drills or hills and allowed to mature to glazing condition before cutting. It was harvested in fine condition. Some reports have come to us of twenty five tons to the acre of well-matured and well-harvested corn, which has been stored in the silo." Mammoth Southern Sweet is still extensively used. The various varieties of Flints and Dents, especially those that mature early, are being tested as silo corns by many farmers.

BUCKWHEAT.

Correspondents, as usual, have little to say regarding buckwheat. Reports agree that it was a good crop where grown, more particularly in the eastern counties. It was harvested early and in good condition, and suffered little from frost or any other cause.

The following table gives acreage and yield in 1890 and 1891, together with the average for the nine years 1882-91 :

Districts.	1891.			1890.			Yearly average for the nine years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	14,010	353,608	25.2	12,029	253,371	21.1	10,451	218,890	20.9
Lake Huron	1,837	46,940	25.6	2,419	38,257	15.8	1,209	23,932	19.8
Georgian Bay	1,547	29,341	19.0	1,522	28,094	18.5	835	14,781	17.7
West Midland	2,781	63,433	22.8	2,990	59,942	20.0	2,373	47,484	20.0
Lake Ontario	34,795	821,230	23.6	27,280	605,902	22.2	19,016	423,566	22.3
St. Law. and Ottawa.	36,733	936,792	25.5	33,488	825,706	24.7	28,375	681,521	24.0
East Midland	14,862	324,330	21.8	9,402	219,012	23.3	6,539	146,000	22.3
Northern Districts	1,314	32,468	24.7	981	23,436	23.9	591	14,826	25.1
Totals	107,879	2,608,142	24.2	90,111	2,055,720	22.8	69,389	1,571,000	22.6

In the Lake Huron and West Midland districts a decrease is observed in the area of the crop compared with the previous year, but in the other six groups an increase is to be seen, and the total area of buckwheat in the province has extended from 90,111 to 107,879 acres. The average yield for the province is 24.2 bushels per acre, being 1.4 bushel more than in the previous year, and 1.5 bushel more than the average for the nine years. The bulk of the crop is raised in the Lake Ontario and St. Lawrence and Ottawa districts.

BEANS.

Beans were not harvested as correspondents wrote in August. The drouth affected the crop considerably, especially late planted, and very poor returns were looked for on clay soils. A good deal of replanting was done, and the crop altogether was reckoned as below the average both as to prospective yield and general condition. The November reports were thus summarised : The bean crop was a rather light one in the south-western counties, but in quality and color the sample was a fair average. The conditions which were unfavorable to the corn crop, affected beans in a similar manner, but not being such a deep feeding crop they suffered more than corn. The table herewith given shows the acreage and yield in 1890 and 1891, and also the average for the nine years 1882-91 :

Districts.	1891.			1890.			Yearly average for the nine years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	32,706	582,169	17.8	30,323	585,846	19.3	18,320	348,871	19.0
Lake Huron	1,024	21,090	20.6	729	11,278	15.5	627	12,817	20.4
Georgian Bay	307	6,782	22.1	429	8,424	19.6	247	4,688	19.0
West Midland	717	14,161	19.7	917	17,033	18.6	1,032	21,203	20.5
Lake Ontario	1,838	37,685	20.5	2,530	44,739	17.7	2,057	43,362	21.1
St. Law. and Ottawa	4,145	94,237	22.7	3,660	75,209	20.5	3,311	78,187	23.6
East Midland	559	10,317	18.5	757	16,491	21.8	557	10,700	19.2
Northern Districts	155	3,159	20.4	111	2,321	20.9	83	1,719	20.7
Totals	41,451	769,600	18.6	39,456	761,341	19.3	26,234	521,547	19.9

The story of the crop in the Lake Erie counties is practically its history for the whole province, as more than three-fourths of the acreage of beans is to be found in that group. A slight increase has taken place in the total area, although in four districts a falling off is noticed. The small yield in the Lake Erie group has brought the average of the province down to 18.6 bushels per acre, as compared with 19.3 bushels in 1890 and 19.9 bushels in the nine years 1882-91. Owing to the increased acreage, however, the total yield of the province is a little more than that of the previous year and very much above the average for the nine years.

FIELD ROOTS.

The August bulletin stated that the prospect for roots had been seriously impaired by the drouth. In the extreme southwestern counties the product was expected to be small in size and poor in quality. Reports from other sections of the province, however, were more favorable. It was stated in the November bulletin that the weather during the ingathering and pitting of roots was all that could be desired, and that in many quarters the work had been completed.

POTATOES. Concerning potatoes the August bulletin said: "The vines have frequently drooped from lack of moisture, and in some instances in the southwestern counties have dried up altogether from the heat. As regards the rest of the province a large yield is expected." According to the November bulletin potatoes, though a large crop, gave cause for anxiety. "Only a few counties appear to have escaped the rot, the loss from this cause being estimated all the way from 5 to 50 per cent. Probably one-quarter of the unusually large yield has already gone by the rot. The only remark made concerning bugs was that they were not nearly as bad as usual." The acreage and yield for 1890 and 1891, together with the average for the ten years 1882-91, are given in the following table:

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	14,518	1,726,531	118.9	14,640	1,156,746	79 0	15,946	1,702,790	106.8
Lake Huron	13,401	2,111,991	157.6	12,706	1,321,519	104.0	12,844	1,517,820	118.2
Georgian Bay	14,870	2,311,767	155.5	14,211	2,071,965	145.8	13,806	1,803,913	130.7
West Midland	26,911	4,251,297	158.0	27,821	3,255,232	117.0	26,762	3,232,356	120.8
Lake Ontario	33,458	4,616,546	138.0	33,670	3,251,595	96.6	31,836	3,599,490	113.1
St. Law. and Ottawa	40,040	6,449,536	161.1	38,335	4,477,866	116.8	38,867	4,975,492	128.0
East Midland	12,526	1,790,550	142.9	12,711	1,442,281	113.5	12,332	1,539,066	124.8
Northern Districts	4,494	797,668	177.5	4,000	583,913	146.0	3,062	469,756	153.4
Totals	160,218	24,055,886	150.1	158,094	17,561,117	111.1	155,449	18,840,683	121.2

The Lake Erie, West Midland, Lake Ontario and East Midland groups each fall below their respective average acreage of the previous year, but the increase in the other four districts makes the total area of the province go 2,124 acres beyond the figures for 1890. The average yield per acre is a great one for the province, being 150.1 bushels, compared with 111.1 in 1890 and an average of 121.2 for the ten years. Each district exceeds its own total yield of the previous year and also its average for the 1882-91 period. The total yield of the province is 6,494,769 bushels greater that of the preceding year, and 5,215,203 more than the average for the ten years. The new land of the Northern Districts has given the remarkably fine yield of 177.5 bushels per acre, the St. Lawrence and Ottawa group coming next with 161.1 bushels. The smallest yield per acre was experienced in the Lake Erie counties.

MANGEL-WURZELS. The drouth prevailing at the time of seeding left the rows of mangels thin and backward in growth, and not very promising when reports were sent in for the August report. Although correspondents did not as a rule speak of the crop as a particularly good one, the November reports were cheerful compared with those of August, and the estimated average yield per acre is somewhat surprising considering the wretched start that root crops generally received. The following shows the acreage and yield for 1890 and 1891, and also the average for the ten years 1882-91 :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	1,846	893,381	484	1,607	701,312	436	1,375	552,055	401
Lake Huron.....	2,892	1,568,156	542	3,370	1,562,735	464	2,444	1,090,102	446
Georgian Bay	897	397,180	443	1,229	497,619	405	996	417,077	419
West Midland.....	8,347	4,614,874	553	8,946	4,203,084	470	6,440	2,974,766	462
Lake Ontario	4,859	2,399,151	494	6,027	2,756,943	457	5,149	2,283,195	443
St. Law. and Ottawa .	2,166	1,018,671	470	2,447	922,461	377	1,760	671,600	382
East Midland	1,872	859,238	459	2,276	933,584	410	1,301	527,388	405
Northern Districts....	82	28,797	351	51	16,780	329	81	21,913	271
Totals	22,961	11,779,448	513	25,953	11,594,518	447	19,546	8,538,096	437

The area of this crop has been narrowed from 25,953 in 1890 to 22,961 in 1891, and every group except the Lake Erie and the Northern Districts has felt the shrinkage. But notwithstanding the smaller acreage, the large yield of 513 bushels per acre (as against 447 bushels in the preceding year and an average of 437 bushels for the ten years) has made the total yield of the province greater than usual. In the West Midland counties the average yield per acre is 553 bushels and in the Lake Huron group 542 bushels, while in the Northern Districts the figures drop to 351 bushels.

CARROTS. This crop made a bad start owing to the dry weather, and the early reports concerning the crop were apprehensive of general failure. Notwithstanding the fact that much of the seed failed to germinate there was an average yield per acre considerably ahead of that of the ten years 1882-91. The acreage and yield for 1890 and 1891, together with the average for the term 1882-91, will be found in the following table :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie.....	834	305,715	367	982	299,056	305	728	211,221	290
Lake Huron.....	982	382,209	389	1,048	371,141	354	1,001	354,491	354
Georgian Bay	903	344,301	381	1,145	417,300	364	1,107	404,000	365
West Midland.....	1,885	875,220	464	2,563	959,592	374	2,233	837,087	375
Lake Ontario	1,917	718,633	375	2,918	1,097,486	376	2,766	1,032,501	373
St. Law. and Ottawa .	2,230	809,609	363	2,141	678,081	317	1,614	506,688	314
East Midland	833	289,938	348	989	346,111	350	823	273,275	332
Northern Districts....	274	88,391	323	191	41,775	219	151	40,084	265
Totals	9,858	3,814,016	387	11,977	4,210,542	352	10,423	3,659,347	351

The number of acres given to carrots is now only 9,858, being 2,119 less than in 1890 and 565 acres below the average for the ten years 1882 91. The excellent yield of 387 bushels per acre, however, has brought the total yield above the average for the ten years, although still lower than the total yield of 1890. The St. Lawrence and Ottawa counties and the Northern Districts are the only groups which exceed their respective areas of the previous year. Every group except the East Midland and the Northern Districts exceeds the average yield per acre of the province for the ten years.

TURNIPS. The August reports concerning turnips were hopeful, notwithstanding the drouth, and expectations were not disappointed. In many portions of the province a magnificent yield was realised, and the average yield per acre is unusually large. As in the case of other roots the weather at the time of pitting was very favorable. The acreage and yield for 1890 and 1891, with the average for the ten years 1882-91, is contained in the following table :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Lake Erie	2,716	1,205,035	444	2,579	859,137	333	2,234	795,314	356
Lake Huron.....	15,136	8,289,606	548	12,636	5,531,452	438	12,809	5,171,968	404
Georgian Bay	15,182	8,585,368	565	13,345	5,678,382	426	12,608	5,257,287	417
West Midland..	38,414	23,198,607	604	36,316	14,975,082	412	35,068	14,835,064	423
Lake Ontario	37,491	19,969,208	533	32,509	15,085,001	464	29,965	12,613,781	421
St. Law. and Ottawa .	5,518	2,619,058	475	5,360	1,967,738	367	4,154	1,465,768	353
East Midland	8,031	3,678,599	458	6,145	2,194,655	357	5,877	2,121,571	361
Northern Districts....	3,587	1,307,971	365	2,165	749,116	346	2,228	720,527	323
Totals	126,075	68,853,452	546	111,055	47,040,563	424	104,943	42,981,280	410

Every group makes a successful showing both in the matter of acreage and yield, compared with its respective figures of the previous year, and its own average for the ten years. The result is that the increased acreage and enlarged yield per acre for the whole province runs the aggregate yield up to 68,853,452 bushels, as compared with 47,040,653 in 1890, and an average of 42,981,280 for the ten years.

HAY AND CLOVER.

In their spring returns correspondents were not agreed as to the condition of clover, although the opinion of the majority was that the new fields were doing splendidly. Old fields had been badly heaved in low and undrained places, and the crop in some of the eastern counties suffered much from ice. Many correspondents, especially in the west, spoke hopefully of the prospects of clover, although it was rather too early for a very good start when the reports were sent in. The fact that the new fields were doing so well was considered very encouraging, as during the past few years old fields had generally been a failure.

The August bulletin had the following regarding hay and clover : "This crop has been unusually light all over the province. It was of average quality, however, and was for the most part secured in excellent condition. The drouth was doubtless the chief cause of the deficiency, but in addition to this, clover in some instances suffered from winter-killing and from the frosts of May. New meadows yielded better than old ones. Both clover and timothy were short in stalk, and timothy was as a rule somewhat thin

in the ground. There has been a vigorous second growth of clover, except perhaps in the Lake Erie and southwestern counties, which do not appear to have been benefited to so great an extent as the rest of the province by the recent local rains. By many this second growth is reported to be quite luxuriant, and some are cutting it to make up for the deficiency in the first crop. The prospects are not favorable for a good yield of clover seed. It is expected to be a failure in Essex, Kent and Elgin, where many are pasturing their cattle in the clover fields. Elsewhere the yield will be very variable according to local conditions and the amount of the rainfall. The most favorable reports for clover seed come from Lincoln county. The clover midge is not reported to be unusually prevalent in any district. Some farmers, more especially in Grey and Bruce, have still a considerable quantity of last year's hay on hand." The acreage and yield for the two years 1890 and 1891, and also the average for the ten years 1882-91, are furnished in the table following :

Districts.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Tons.	Tons per acre.	Acres.	Tons.	Tons per acre.	Acres.	Tons.	Tons per acre.
Lake Erie	298,233	298,329	1.00	286,576	525,644	1.83	276,452	392,554	1.42
Lake Huron	277,622	245,810	.89	270,648	484,865	1.79	237,636	321,816	1.35
Georgian Bay	219,568	208,809	.95	209,795	375,602	1.79	194,305	247,205	1.27
West Midland	435,867	498,241	1.14	433,638	897,491	2.07	411,030	619,507	1.51
Lake Ontario.....	444,932	429,630	.97	417,641	760,974	1.82	410,071	562,026	1.37
St. Law. and Ottawa.	626,893	546,845	.87	618,434	895,976	1.45	561,469	727,136	1.30
East Midland	184,330	124,592	.68	168,581	267,568	1.59	156,212	181,919	1.16
Northern Districts ..	62,530	40,542	.65	56,689	97,795	1.73	43,320	50,570	1.17
Totals.....	2,549,975	2,392,798	.94	2,462,002	4,305,915	1.75	2,290,495	3,102,733	1.35

The foregoing table reveals the unusual fact that while the acreage in each district is larger than in the previous year, and also larger than the average for the ten years, the average yield in each instance is smaller than in both of the other periods. The yield for the year aggregates 2,392,798 tons, which falls 1,913,117 tons below the yield of 1890, and 709,935 tons below the average for the ten years. The Lake Erie district averages exactly a ton per acre, and the West Midland counties go as high as 1.14 tons, but the six other groups fall below the ton.

Clover Seed. The yield of clover seed is this year very light. With the exception of the southwestern counties, where the early and late drouth was very disastrous to the clover crop, there was in most localities a fine second growth, it being in some instances more luxuriant than the first; but for some reason the crop is reported not to have blossomed well, some think on account of rankness of growth. Owing to this and to other causes, comparatively little was kept for seed, much being cut to make up for the deficiency in the hay crop, or else pastured. The ravages of the midge, in addition, appear to have been even more extensive than usual this season; the small varieties of clover suffering most. The greatest damage from this pest is reported from the Lake Erie and Lake Ontario counties.

COMPARATIVE YIELDS OF FIELD CROPS.

Aggregate Yield of Field Crops. The acreage and average yield per acre, which go to make the aggregate yield, are dealt with elsewhere, and the following

table gives the net results of the annual variations of these two factors. The aggregate yields of the leading field crops are shown for each of the last five years, together with the averages for the seven years 1885-91 and the ten years 1882-91.

Field crops.	1891.	1890.	1889.	1888.	1887.	1885-91.	1882-91.
	bushels.	bushels.	bushels.	bushels.	bushels.	bushels.	bushels.
Fall wheat	21,872,488	14,267,383	13,001,865	13,830,787	14,440,611	16,708,937	18,059,235
Spring wheat	10,711,538	7,683,905	5,697,707	6,453,559	5,633,117	7,832,609	8,882,998
Barley	16,141,904	15,600,169	23.386,388	23,366,569	17,134,830	18,810,818	19,349,351
Oats	75,009,542	52,768,207	64,346,301	65,466,911	49,848,101	60,190,630	58,410,603
Rye	1,134,630	1,563,345	1,431,679	1,295,302	894,887	1,242,544	1,683,211
Peas	18,323,459	15,389,313	13,509,237	14,269,863	12,173,332	14,816,447	13,908,658
Corn	18,288,659	14,011,181	9,248,199	17,436,780	8,404,752	12,705,182	12,810,314
Buckwheat	2,608,142	2,053,720	1,272,578	1,222,283	1,025,353	1,627,351	1,571,000
Beans	769,600	761,341	371,893	534,526	275,975	527,424	521,547
Potatoes	24,055,886	17,561,117	14,355,529	22,273,607	10,678,000	18,003,949	18,840,683
Mangel-wurzels	11,779,448	11,594,518	7,223,478	10,020,659	5,695,761	8,966,048	8,538,096
Carrots	3,814,016	4,210,542	3,431,959	3,898,584	2,105,686	3,485,980	3,659,347
Turnips	68,853,452	47,040,563	37,021,260	47,640,237	31,413,456	45,738,251	42,981,280
	tons.	tons.	tons.	tons.	tons.	tons.	tons.
Hay and clover	2,392,798	4,305,915	3.728,313	2,009,017	3,093,610	3,110,893	3,102,733

Fall wheat, spring wheat, oats, peas, corn, buckwheat, beans, potatoes, mangel-wurzels and turnips exceed their respective yields of any previous year and also the average for the seven and ten years' periods. The year 1888 gave the smallest crop of hay, and 1891 comes next.

Ratios of Aggregate Crops. The per cent. ratios of the aggregate production of the several crops in 1891, as compared with the average for the ten years 1882-91, are given in the following table by county groups and for the province, each group being compared with its own average:

Districts.	Fall Wheat.	Spring Wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buck-wheat.	Beans.	Hay and Clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.
Lake Erie	139	120	90	110	73	114	116	162	167	76	101	162	145	152
Lake Huron	122	119	82	130	114	141	177	196	165	76	139	144	108	160
Georgian Bay	112	98	88	131	84	133	187	199	145	84	128	95	85	163
West Midland	123	126	94	129	63	133	145	134	67	80	132	155	105	156
Lake Ontario	109	124	79	129	68	134	147	194	87	76	128	105	70	158
St. Lawrence and Ottawa	74	128	87	133	66	122	238	137	121	75	130	152	160	179
East Midland	78	121	70	128	61	132	182	222	96	68	116	163	106	173
Northern Districts	128	87	140	146	88	180	174	219	184	80	170	131	221	182
The Province	121	121	83	128	67	132	143	166	148	77	128	138	104	160

Barley, rye and hay are the only crops which do not reach 100 in the figures for the province, while buckwheat and turnips touch 166 and 160 respectively. (100 in every case represents the average of the crop for ten years). Oats, peas, corn, buckwheat, potatoes and turnips go over the standard in every group.

AVERAGE YIELDS PER ACRE. The yields per acre of the staple field crops are given in the following table by county groups for the years 1890 and 1891, together with the averages for the seven years 1885-91 and the ten years 1882-91:

Field crops.	Lake Erie.	Lake Huron	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.			
									1891.	1890.	1885-91.	1882-91.
	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	bush.
Fall wheat	25.7	26.8	24.9	28.1	23.4	17.6	18.7	23.2	25.7	19.8	19.9	20.0
Spring wheat ..	16.5	20.7	19.6	22.0	20.8	23.6	18.6	20.1	21.0	12.8	14.7	15.8
Barley	25.4	29.0	29.5	30.9	28.8	30.1	28.3	25.1	29.2	22.2	25.7	26.0
Oats.....	38.1	40.4	38.1	44.1	42.3	41.0	36.2	30.5	40.8	28.0	34.1	35.1
Rye.....	17.4	18.8	18.5	19.3	14.9	18.2	15.6	19.6	16.7	15·2	15.5	16.2
Peas	19.9	26.4	25.2	25.6	23.3	24.9	23.5	24.5	24.4	19.7	20.7	20.8
Corn.....	76.1	76.6	55.0	81.5	72.5	77.7	66.7	47.5	75.9	62.6	65.2	66.1
Buckwheat....	25.2	25.6	19.0	22.8	23.6	25.5	21.8	24.7	24.2	22.8	22.4	22.6
Beans.....	17.8	20.6	22.1	19.7	20.5	22.7	18.5	20.4	18.6	19.3	19.3	19.9
Potatoes.....	118.9	157.6	155.5	158.0	138.0	161.1	142.9	177.5	150.1	111.1	119.1	121.2
Mangel-wurzels	484	542	443	553	494	470	459	351	513	447	435	437
Carrots.....	367	389	381	464	375	363	348	323	387	352	339	351
Turnips	444	548	565	604	533	475	458	365	546	424	417	410
	ton.	ton.	ton.	ton.	ton.	ton.	ton.	ton.	ton.	ton.	ton.	ton.
Hay and clover	1.00	.89	.95	1.14	.97	.87	.68	.65	.94	1.75	1.32	1.35

The West Midland group has the honor of showing the highest average yields for fall wheat, barley, oats, corn, mangel-wurzels, carrots, turnips and hay and clover. The Lake Huron counties lead in peas and buckwheat, the St. Lawrence and Ottawa group in spring wheat and beans, and the Northern Districts in rye and potatoes.

RATIOS OF YIELD PER ACRE. The appended table shows the per cent. ratios of the average yield per acre of the leading field crops, compared with the average yield of the ten years 1882-91, by county groups and for the province, each group being compared with its own average:

Districts.	Fall Wheat.	Spring Wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buck-wheat.	Beans.	Hay and Clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.
Lake Erie	134	111	103	107	112	107	108	121	94	70	111	121	127	125
Lake Huron..... ..	134	144	109	114	106	118	121	129	101	66	133	122	110	136
Georgian Bay	120	131	115	114	103	116	103	107	116	75	119	106	104	135
West Midland.....	137	143	108	115	116	117	122	114	96	75	131	120	124	143
Lake Ontario.....	115	127	110	116	101	115	120	106	97	71	122	112	101	127
St. Lawrence and Ottawa.	98	141	123	125	102	125	127	106	96	67	126	123	116	135
East Midland	96	127	117	115	100	121	124	98	96	59	115	113	105	127
Northern Districts.....	120	111	106	99	102	106	114	98	99	56	116	130	122	113
The Province.....	129	132	112	116	103	117	115	107	93	70	124	117	110	133

Beans and hay and clover are the only crops going below the 100 for the province, the latter showing a per cent. ratio of but 70, while it falls to 59 and 56 in the East Midland group and the Northern Districts.

FRUIT AND FRUIT TREES.

The May bulletin contained the following summary of the condition of fruit and vegetation: "A majority of correspondents report vegetation well advanced, and in many cases cattle are feeding on grass. Where the grass is backward, it is sometimes stated that it began well but that growth was retarded by the dry and frosty weather of the latter part of April, and that rain is needed. The reports for orchards are decidedly favorable. The somewhat mild winter was good for fruits, large and small, and the injury from frost was inconsiderable. The apple trees in every part of the province are looking well, and give promise of a large crop; the reports vary mainly as to progress. In some cases, chiefly in the west, the trees are in leaf, and one correspondent reports them in bloom. The reports as to plum and cherry trees also would be good where it not for the large number of correspondents who speak of the ravages of black-knot. There are reports of orchardists ceasing to look for cherries, and cutting down the trees. Peaches, plums, cherries and small fruits are well advanced. Many correspondents in Essex, Kent and the Niagara peninsula report them in bloom, and some fear that they have blossomed too early, and may be injured by spring frosts. Grape vines and small fruits have come through the winter well, and look healthy and promising. Field mice did some damage to young trees, especially in Wellington, Grey, Dufferin, Muskoka and Parry Sound. Only one correspondent (in Lanark) speaks of bark lice." On three or four days during the first week of May the thermometer fell below freezing point, but except in one or two localities but little injury was done to fruit.

The bulletin issued in August thus referred to the orchard and small fruits: "The yield of apples will this year probably be light so far as Ontario is concerned, lighter even than last year. The quality of the fruit is, however, very fair, and the sample generally well shaped and free from blemishes. Harvest apples have yielded somewhat better than the later varieties. Pears are also a light yield. The causes of the deficiency are stated to be frosts at the time of blossoming and the general drouth. The trees are said to have blossomed well, but even where the young fruit had formed it afterwards fell off, in some instances on account of insufficient moisture. There has been a fairly good yield of other tree fruits. Cherries have been unusually abundant. Plum trees have been well loaded with fruit, but their number has been so greatly diminished by the black-knot scourge that the yield of fruit cannot be a large one. Grapes and peaches were slightly injured by late frosts, but the yield of both will be good. Small fruits have been plentiful almost everywhere, but least so in the Lake Erie district. Wild raspberries were unusually abundant in some of the northern counties. Strawberries yielded fairly well, but the fruit was rather undersized. On the Niagara peninsula there was a good yield of all varieties of fruits." It is to be regretted that more attention is not devoted to the cultivation of fruits on our farms. A little systematic pruning and manuring and the replacing of trees that have ceased to bear by young trees of tried varieties would ensure a good average yield with but little trouble or expense.

The November bulletin contained the following reference to fruit: "Reports are not uniform regarding the yield and quality of fruit. In the Lake Ontario counties a splendid yield of apples is reported; large shipments have been made, and some yet remain for exportation. In the western counties apple orchards did not bear as heavily as in former years, but there is plenty for home consumption and a considerable quantity will be shipped. Wind storms did damage to trees and fruit in the fall in different sections of the province, and a hail storm wrought much injury to apples in Prescott. A few correspondents complain of the codling moth, while others rejoice over the fact that they have suffered little or no damage from it or other insects. While in a few localities there is much wormy fruit, the crop generally is pretty free from worm or spot. Pears suffered from blight in some quarters, but on the whole the crop may be regarded as a good one, and a considerable quantity has been exported. Quinces are reported as a fair crop where grown. Peaches were not plentiful, although in some counties a surplus is reported. Where untouched by the curculio and black-knot, plums did remarkably well. The most encouraging reports regarding this variety of fruit come from the county of Grey. Cherries also gave a good yield, but black-knot is still doing deadly work among plum

and cherry trees. Grapes have been very plentiful. A Welland correspondent says: 'In fact the grapes were not all picked, as we could not get a market for them.' Small fruits yielded well. The season generally was favorable to the handling of fruit, although two or three correspondents claim that the first part of the fall was so warm that the keeping qualities of the earlier sorts of apples were badly affected. The latter part of the autumn, however, was well adapted for the maturing of the young wood on vine, bush and tree, and orchards are about to enter the winter in good general condition."

Remarks of Correspondents.

Gosfield S., Essex: We expect nearly all the frontier of Essex to be used for fruit of all kinds. Drying and canning is becoming quite a business. In the village of Ruthven there is one firm drying 200 bushels of apples per day, and using as many more for cider and jelly.

Pelee Island, Essex: Our grape crop was a remarkable one. Over 260 tons of the finest grapes have been pressed in one large wine cellar, and about 100 tons more have been made into wine by others or shipped in baskets for table use. Several persons have had five tons of Concords to the acre.

Raleigh, Kent: At one time along Talbot street cherries lined the road for miles, but to day not fifty trees are standing where five years ago 500 bore full crops. The Black-knot Act is a dead letter in Raleigh.

Saltfleet, Wentworth: About ten tons of grapes have been shipped daily from Winona during the past six weeks, with two weeks' supply yet to go. This will be doubled in five years easily.

Athol, Prince Edward: The most distinctive feature in connection with the farming industry in this locality is the extent to which the growing of small fruits, such as the various kinds of berries, and tomatoes, sweet corn, etc., have displaced the staple crops of grain.

Area in Orchard and Garden. The table following gives the area in orchard and garden by county groups and for the province for each of the years 1887-91, together with the rate per 1,000 acres cleared in 1891:

Year.	Lake Erie.	Lake Huron	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Middlesex.	Northren Districts.	The Province.
	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.	acres.
1891.....	40,802	22,167	11,858	37,704	53,267	12,011	9,130	893	187,832
1890.....	39,517	21,600	11,858	37,338	52,438	11,098	8,330	617	182,796
1899.	39,699	21,105	11,729	37,256	52,242	12,079	8,130	526	182,766
1888.	38,015	20,342	11,620	36,524	53,881	11,733	7,839	603	180,557
1887.....	37,067	19,874	11,129	37,402	54,080	12,401	8,911	578	181,442
Rate per 1,000 acres cleared, 1891.....	28.9	16.4	11.1	16.3	23.1	5.1	10.8	5.4	15.9

There are now 187,832 acres of farm property in orchard and garden, being an increase of 5,036 acres over the previous year. Every group has shared in this increase, excepting the Georgian Bay counties, where the figures for 1890 are unchanged. Out of every 1,000 acres of farm land cleared an average of 15.9 acres are in orchard and garden, the figures ranging from 5.1 in the St. Lawrence and Ottawa group to 28.9 in the Lake Erie district. The statistics of orchard and garden are compiled from returns received from township assessors.

FALL PLOWING.

The cold spring made the harvest rather late and crowded general fall work. The unusually dry weather prevailing late in the season also rendered plowing difficult on clay lands, and many were waiting for rain before getting at this work. Some correspondents however say that owing to the absence of heavy rains there was was little or no baking of the soil, and that, although unusually dry, the land took the plow very nicely. Here and there correspondents report plowing as about completed but taking the province as a whole there was still much to do in this line after the 8th of November.

FARM IMPROVEMENTS

The progress which takes place from year to year in this line of farm work is steady and sure throughout the greater part of the province. This year has been no exception to the rule. A considerable amount of under-draining has been accomplished in the western part of the province, particularly in the Lake Erie and Lake Huron counties. Little else except tile is now being used for this purpose, as it is generally conceded to possess immense advantages over stone and timber, and is found to be the cheapest in the long run. A farmer in Huron county writes: "Twenty-five years ago I drained fifty acres with tile, and all the drains are now working as good as ever. Wood drains as a rule do not last over ten years." The demand for tile has been brisk, and manufacturers are yearly increasing their output. In nearly all localities there is a scarcity of really skilled hands for this work, particularly in parts where little of it has heretofore been done. Some complaint is made of the backwardness of municipalities to construct main drains, thus rendering it difficult or impossible to obtain suitable outlets and retarding the progress of the work. Draining machines are very rarely used, and have not as yet found much favor, although where the land is free from stones they appear to do satisfactory work. Rapid improvement continues to take place as regards fencing. Several descriptions of wire fencing are becoming very popular, and considerable hedge planting has also been done in some sections. There is also a growing improvement in farm houses and farm buildings. Many farmers are now building bank barns, and many are placing their barns on brick and stone foundations.

FARM SUPPLIES IN THE SPRING.

The May bulletin had the following concerning farm supplies at the close of the winter: "With the exception of hay, it cannot be said that there is much in the way of supplies left in the hands of farmers. Whilst here and there a few farmers have held on to their wheat for a prospective rise, in the vast majority of cases the pinch of the times compelled a sale, and in more than one locality correspondents report that farmers were buying their flour. Oats are very scarce, a number of farmers having barely enough for seed, and in the eastern counties prices are higher than for years. Other grains are also scarce. In fact hay is the only fodder of which there has been a sufficiency, many barns being still well filled and hay stacks being a more common sight than usual at this season. It is a drug in many counties, and the low prices prevailing during the winter have been discouraging to those agriculturists who had raised the crop for the market. Fat cattle are few, nearly all having been bespoken for May shipment. The supply of store cattle is also less than usual. Notwithstanding the superabundance of hay in most sections of the province, the scarcity of coarse grains prevented the best results in the feeding of cattle, and lessened the number held by raisers when the grass came."

THRESHING AND MARKETING.

The November bulletin, under date of the 9th, had the following: The work of threshing is now nearly completed in all sections of the province. Comparatively little marketing has, however, as yet been done, probably not more than one-third of the available crop having been disposed of. Wheat is moving very slowly, as many are holding it in anticipation of higher prices. Very little barley has been marketed, and as the demand is not brisk and prices are low, many intend to use it for feed. The movement has been more marked as regards peas and oats, however, and greater freedom in the marketing of all grains is now looked for.

CLEARING AND CLEANING LAND.

Below are given a number of replies to questions regarding the clearing of land and the extent of bare fallows. While there is much uniformity of method reported in clearing bush farms and preparing the land for cultivation, there is a considerable division of opinion upon the matter of bare fallows. It is pointed out, however, that in most sections of the province it is not now necessary to clear much land, and it is even stated that in a few localities in eastern Ontario trees are being planted as a provision for the future. Where bush land is to be cleared the general custom is to chop down the standing timber and dispose of it as sawlogs, railway ties, cordwood or for whatever it is best fitted. The brush is then piled and burned and the land seeded down and left as pasture until the stumps rot, which is generally five or six years. The stumps are then pulled out by oxen, horses or machines and the land is sown to grain, or perhaps to some hoed crop to kill the weeds. Bare fallowing, though still popular in some quarters, appears to be declining in favor. Preference is expressed by some for hoed crops such as corn, potatoes, turnips or rape for keeping the soil clean. A diversity of opinion is manifested regarding the treatment of dirty fields. Some of the suggestions are really valuable, and must commend themselves to practical farmers.

Gosfield N., Essex: Only the brush and partially decayed timber remains to be burned after the sawlogs and cordwood are taken off, and these are easily burned in a dry time like the present. It is not so difficult a matter to clear land here at present as it was several years ago. Then all the timber that grew on the land had to be chopped, logged and burned; and moreover the land is now getting pretty well drained, which helps greatly in clearing. There is no summer fallowing done here at present.

Harwich, Kent: If you enquire about clearing off the timber, that is nearly all gone. If you mean cleaning of weeds, hoeing is the principal means. There are thousands of acres of beans and corn grown here, nearly all of which is hand hoed in addition to constant cultivating, and no weeds are allowed to show if they can be kept under. There is very little summer fallowing.

Chatham, Kent: No timber goes to waste; all is utilised. Considerable summer fallowing is done to kill thistles, as that is a sure way to get rid of them.

Walpole, Haldimand: The land is nearly all cleared in this section. Where a man has a small piece to clear he gets the wood cut into cordwood, seeds his fallow down and lets it stand until the stumps rot—generally about six years. About 12 per cent. of the arable land here is summer fallowed.

Bertie, Welland: The wood is chopped and sold and the land pastured until the stumps are rotted and can be pulled out. There is not so much fallowed land as some years ago. Many work sod down finely and get good wheat.

Stamford, Welland: The stumps are removed by machine, and burning and plowing in the fall. Summer fallowing is fast becoming a thing of the past.

Sombra, Lambton: The timber is chopped in winter and burned off the following summer. In September and October it is logged and burned, then sowed to oats and seeded down, and left for pasture or meadow until the stumps rot. The oats are dragged, and where well done there are splendid crops.

Usborne, Huron: All the wood and timber is drawn off, and the brush burned with the rubbish. Very little land is worked for summer fallow, but a lot of sod and clover stubble is plowed in July as a fallow and seed bed for fall wheat.

Tuckersmith, Huron: In this township all the farms are cleared up. There is a considerable amount of summer fallowing. My experience teaches me that for cleaning a dirty farm there is no method so good or effectual.

Wawanosh, Huron: Most of the timber is cut into logs or cordwood and taken off in the winter. What is left is burned and cleared of brush and old timber the following summer and sown with fall wheat or other grain, or turnips. Some allow the brush and other refuse timber to rot before clearing, but this allows the land to get very dirty. Summer fallows are going out of fashion.

Brant, Bruce: The cleaning of thistles and other weeds is best accomplished by hoed crops such as potatoes, turnips and rape, and also by summer fallowing, and, if done properly, with good results. There is not very much summer fallowing where root crops can be sown with success.

Bentinck, Grey: A good many prefer a hoed crop to summer fallowing for cleaning land, but I think there is more success with summer fallowing, as a hoed crop is often neglected. The extent of summer fallowing is generally from five to ten acres.

Euphrasia, Grey: The trees are chopped down, and so much of the timber used as can be disposed of. The rest is burned on the ground. Nearly all the land is cleared. About eight or ten acres of summer fallowing is done on each farm. Since farmers have taken to raising turnips there is not as much summer fallowing as previously.

Glenelg, Grey: There is not much summer fallowing in this district. We depend chiefly upon seeding down with clover. There are plenty of thistles yet. Good cultivation, short rotation and plenty of clover is the best remedy.

Medonte, Simcoe: Nearly all land clearing is done by culling out the timber, as it is sold for firewood, logs or bark; then the brush is burned off. There is generally a good crop on new land. Summer fallowing is not practised quite as much as it used to be, but a few farmers have from five to ten acres each year.

Tiny, Simcoe: After chopping and logging we take out the stumps with machines for that purpose, and also lift the larger stones with a machine. We do not summer fallow so much as we used to do. We prefer to have from five to ten acres, and sow fall wheat on pea land.

Ekfrid, Middlesex: There is very little left to be cleared. What is done is by the old method. As a market can be found now for the timber on the land, the work of clearing such land is now less expensive than of old. There are still some fields summer fallowed where heavy clay needs it, but on lighter soils where it can be avoided the practice is being discontinued.

Westminster, Middlesex: The prevailing method is bare fallow, plowing in June and surface cultivation afterwards. Another system is plowing in June, sowing buckwheat half a bushel to the acre, rolling after the harrow, and then plowing down the buckwheat when in bloom for manure. It is sure death to the Canada thistle. It also allows the barnyard manure to be applied to stubble land that may be sown also to wheat. I found it a success.

Williams W., Middlesex: Numbers of farmers have bought two-furrowed plows, and immediately the crop is housed turn over the stubble, plowing three inches deep, and about the first of November commence plowing with the common plow. In the spring it is turned over again with the two-furrowed plow and sown. If any thistles appear they are either spudded or topped with a scythe—more frequently the latter. After the second season few thistles appear above the grain. Rolling the land is exceptional, when it should be general.

Blandford, Oxford: There are a considerable number of farmers here who do not summer fallow, but put in their wheat in the fall after either peas or barley. For myself I always reckon to put the half of my fall wheat from fallow and the other half after peas, barley or clover seed. I have had good crops of wheat by these various methods.

Zorra E., Oxford: Plow up sod after pasturing up to July 15th or after the hay is taken off, and work for fall wheat. Gang plow all stubble not seeded as soon as possible after crop is off, and harrow well as often as necessary. Most of the fallow is to enable draining to be done in dry weather.

Blanshard, Perth: Either root crops or summer fallow, if properly attended to, will clear land pretty well of thistles. For wild oats we always seed down with a grain crop, and after we get them thinned out in this way we have them hand-weeded.

Fullarton, Perth: The two and three crop systems are generally followed. The land that is well cultivated by gang-plowing and deep plowing in the fall, disc harrowed in the spring and well put in and spudded once in summer if required, does not need much summer fallowing.

Mornington, Perth: Chop down and pile the brush. Then cut to stove wood or saw logs, or split to rails. Put the refuse into log heaps and burn. The balance (the stumps) are left in a few years longer, and if not burned where they stand are jerked out by horses and piled together and burned. It is pretty well cleared here now.

Wallace, Perth: First cut down the trees and cut down the trunks into logs or cordwood, burn the brush and seed down. Allow five or six years for the stumps to rot and then dig them out. Summer fallowing will average about eight acres to every one hundred acre farm in this township.

Eramosa, Wellington: When our land gets dirty we put it into root crops, dung it well and keep the scuffler and the hoe going all the summer season to kill the weeds. The next year we seed down with timothy and clover, and let it lie in sod for three years.

Minto, Wellington: Very little land has been cleared of late. Summer fallowing is not generally practised. We only fallow an occasional field when it gets very weedy.

Niagara, Lincoln: Land is cleared in this section only as the timber is used for firewood and other purposes, after which it is broken up and planted to corn. Summer fallowing is still resorted to, and with great success in some instances.

Esquesing, Halton: Summer fallowing, when thoroughly done, succeeds well for thistles and other weeds, except red root and wild flax, which can be cleaned out only by pulling in spring or leaving fallow and cultivating for a spring crop. About eight to ten per cent. of cleared land is generally summer fallowed.

Trafalgar, Halton: Clearing land is a thing of the past here, except pulling the stumps out. There is not much summer fallowing done. We generally sow with peas or barley and cultivate for wheat.

Albion, Peel: The timber is all wanted for local use. It is first cut down and prepared for whatever it may be best suited for, and then all the useless timber and brushwood is cast into the fire. Then the plow is brought into use to prepare for seeding. Perseverance invariably proves the degree of success. There is a summer fallow of about twelve acres in a hundred each year.

Gwillimbury E., York: Land is cleared here by using the wood for firewood or lumber and burning the brush. Summer fallow is slowly but gradually going out of date. Perhaps it would now average five or six acres to a hundred acre farm.

Darlington, Durham: Land which is overrun with weeds is most successfully cleaned with a hoed crop. There has been very little summer fallowing in this township for some years, except after hay.

Darlington, Durham: We have no land to clear except from weeds; but in former days we cut the timber down in winter, cut it into suitable lengths so that a yoke of oxen could draw them, piled the brush and when dry enough burned it. Then came the logging. Three men with team and driver would log about an acre per day, and then burn the log heaps.

Brighton, Northumberland: There is no land cleared to any extent in this locality, and there is not much summer fallowing. The prevailing method is to plow up clover and sow winter wheat; also to sow wheat on pea stubble.

Seymour, Northumberland: If you mean clearing off the timber, very little is left to clear, and that little is usually cleared by cutting into firewood and burning the brush. The most difficult, and in many places endless work, is clearing the land of stones. Summer fallow is more practised than formerly, as fall wheat is taking the place of barley.

Hallowell, Prince Edward: To eradicate quack grass buckwheat is grown and corn planted, and with either we met with fairly good success. There are not many summer fallows around here.

Richmond, Lennox and Addington: The timber is cut, and the fallow burnt over, followed by seeding down and pasturing till the stumps get rotten. The stumps are then removed, piled and burned, and the ground plowed and prepared for a crop.

Pittsburg, Frontenac: There is not as much land summer fallowed as formerly. The plan now followed is to plow very lightly immediately after harvest and leave until fully dried. Then harrow and cultivate several times before ridging for winter. Land worked in this way has given good results the next summer.

Matilda, Dundas: Very little land is being cleared now, except of stones, which are either put on fences or broken for the road by steam stone-hammers. There is very little summer fallowing done.

Winchester, Dundas: The bush fires took down a good deal of low land bush three years ago. Wood and logs have been taken off, and the rest piled up and burned. The roots have been burned out and the land made ready for the plow. There is not as much summer fallow as there should be.

Roxborough, Stormont: All the standing timber is chopped down and taken to market as saw logs, cordwood or in any shape to make money of, and the land is left for a number of years to young stock and sheep to browse on, when the stumps can be pulled, the land broken up and sown to buckwheat. There is no summer fallowing done here as far as I know.

Caledonia, Prescott: There is very little land cleared nowadays except swamps, which are first drained and when very dry set fire to. This burns muck, brush, etc., leaving a clay soil. I did not see a summer fallow this year.

Longueil, Prescott: Cut off the wood, burn the brush and muck in a dry time, seed down to alsike and timothy, pasture till the stumps rot, so as to be easily pulled, when they can be piled and burned. Plow the land and bring it into cultivation.

Osgoode, Carleton: Take off the wood and let it run to pasture until the stumps rot enough to come out. Land comes into cultivation sooner than the old way, clearing up and mowing hay. The cattle keep all young sprouts from growing. There is very little summer fallowing.

Osgoode, Carleton: Summer fallowing is not done now to so great an extent as a few years ago. The land is cleaned now by manuring and putting in a crop of potatoes.

Bromley, Renfrew: Where there is large timber, clearing is done by cutting down the underbrush first, and then the large trees, making them into saw logs, fence logs or firewood. The brush is properly piled, and when dry the fallow is set fire to. After burning we pile up the logs that remain and all rotten wood or sticks and burn them off; drag with a V drag both ways and sow to wheat or grass. If the trees are all small we cut them down in windrows and pile and burn them off as before.

Douro, Peterborough: Clearing land is done by taking off and disposing of the timber, and then piling up the rubbish and burning it. Then sow a grain crop and seed with timothy until the stumps rot. About five per cent. of the cleared land is summer fallowed.

Glamorgan, Haliburton: Underbrush before snowfall, chop in the winter and burn in the spring. This, except in a wet spring, seldom fails. There is very little summer fallowing in this township. Clover with two years' crop, and rye cut for hay and sown with rape in the end of June can be relied on to clean land.

Dungannon, Hastings: Chopping in winter and brushing, burning in the early part of spring and logging; then sowing potatoes and grain. Summer fallowing is good for the crop and good for the land. It improves the soil and kills the weeds.

Tyendinaga, Hastings: I might say that the land is all cleared with the exception of wood for fuel. Planting seems to take the place of summer fallowing to a large extent.

Monck, Muskoka: The method of clearing now is to take out the hemlock for bark, rails and lumber, and the heavy hardwood sawn into firewood. Then that remaining is cut down, but the land is seldom plowed till most of the small stumps are rotten.

Morrison, Muskoka: The usual method followed by settlers here is chopping and burning off, being a woodland district. There is no summer fallowing. Hoed crops in rotation are preferred, and found to be more profitable.

Cockburn Island, Algoma: Only small fallows are chopped. Neighbors exchange help to log. About one out of three summer fallow, and use three to eight acres for the purpose.

REMARKS OF CORRESPONDENTS.

Correspondents were invited to report upon special crops, new phases of farm work, etc., and from among the replies sent in under this head the following selections have been made :

LUCERNE.

Canboro', Haldimand : Lucerne is grown in a small way but it will be raised more generally as it is certain to increase in favor.

Vespra, Simcoe : Lucerne, or alfalfa, has been tried by a few, but it does not seem to be a sucess. It does not winter well.

Westminster, Middlesex : Lucerne is a grand crop for soiling. I have cut it four times this summer. It yields heavily and is greatly relished by working horses, but it is rather too coarse for curing as clover is cured. It is away ahead of corn for soiling, and is about three weeks earlier than red clover.

Hallowell, Prince Edward : Some lucerne is grown here and it is looking fine. It is a good crop for fall pastures.

Watt, Muskoka : Last year I put in a small experimental plot of lucerne and had a good catch. I put it in new turned sod and put in a crop of rye with it. I left the aftergrowth in fall as a protection for the winter, but little of the lucerne was left in the past summer as the grass seems to have smothered it out.

MILLET.

Raleigh, Kent : A number of acres were sown when it was seen the hay crop would be light. On account of the protracted drouth a great deal of the seed never sprouted, and consequently the crop is a light one, but cut and secured in good condition.

Canboro', Haldimand : Millet is grown to some extent here both for fodder and seed. It pays to grow it as a green crop.

Canboro', Haldimand : Millet is grown in this locality, and as a grain is found excellent food for poultry. It also makes a rich and excellent chop when mixed with oats or any coarse grain for feeding to either hogs or cattle. When cut green it makes a superior hay. It has also this advantage, that it can be sown as late as the middle of June after the rush of the spring work is over. A good average crop will yield not less than three tons to the acre.

Walpole, Haldimand : Millet, or Hungarian grass, has been sown in considerable quantities. That which was sown early did not come up very well, but the late sown was very fair, and taken on the whole the crop will have a beneficial effect in relieving the scarcity of the hay crop.

Crowland, Welland : Considerable millet was sown on land prepared for corn which failed to grow. The millet proved a good substitute and will make quite an addition to the feed.

Ashfield, Huron : There has been a large quantity of millet sown, owing to the partial failure of the hay crop, and there has been a very good growth.

Huron, Bruce : There was some millet or Hungarian grass sown this year, which did very well, but it is not a common crop.

Gower N., Carleton : Some millet was sown this season and it turned out very well. It was sown as a substitute for hay, as the forepart of the season was very dry and the prospect for hay was poor.

St. Joseph's Island, Algoma : It was evident early in the season that hay was to be a very poor crop. Many farmers broke up some old meadow and sowed millet, which got the rain that came too late to benefit the hay crop. It yielded very satisfactorily, and will materially help many a farmer to tide over the winter months.

RAPE.

Usborne, Huron : Rape is coming into notice for plowing under for manure. I think it will materially increase the fertility of land. It should be sown in August or early in September and plowed under in the fall.

Westminster, Middlesex : A little rape is sown for pasturing lambs and it is very good.

Zorra E., Oxford : There is some rape grown but it is not popular among dairymen on account of rank flavor.

Erin, Wellington : Rape is grown to a great extent in this locality and makes a splendid feed for lambs and cattle.

Guelph, Wellington : There has been a very large breadth of rape grown yearly here for the purpose of fattening lambs for the American markets. I believe that this year there are not less than two thousand lambs being fattened for that market. The greater number of these lambs are secured from different parts of Ontario early in the fall and put on rape, and sold generally for shipment to the United States in the month of October and November.

Peel, Wellington : Rape is sown generally, and by some farmers extensively for fattening sheep and lambs. It was a heavy crop this season.

Scarboro', York: I think it would be well for farmers to pay more attention to the growing of rape, especially those who summer fallow with the expectation of putting in spring grain the next year. When sown for the purpose of enriching the soil by plowing down the land should be worked nice and fine and then sown broadcast and rolled. This should be done anytime from the 1st to the 15th of August. But rape sown for sheep should be in drills and much earlier.

Mara, Ontario: Rape has been grown more extensively than usual, and gave excellent results in fattening lambs and old ewes.

Charlottenburg, Glengarry: There has been a small quantity of rape grown this season for an experiment. It has done remarkably well.

Glamorgan, Haliburton: Rape has been sown this summer and made good fall feed, but with what success against thistles it needs another season to prove. The seeds were sown after tares in my own case. Next year I have a piece of rye to cut green and sow with rape to feed to sheep in the fall.

FLAX.

Canboro', Haldimand: Flax is a considerable crop here. It is grown for seed only, which is used for feeding purposes by mixing with other grain or meal for feeding all kinds of stock.

Crowland, Welland: The flax crop has not been very good this season owing to the dry weather in June.

Bosanquet, Lambton: Considerable quantities of flax are produced in this vicinity. The forepart of the season was too dry for this crop, but when the rains came the growth was very rapid, and about an average crop was harvested. A limited quantity of sorghum is also grown.

Grey, Huron: A good deal of flax was sown in this township this year and has been for some years past. It was a very good crop this year both in quality and quantity.

Stephen, Huron: Flax is grown to a considerable extent in this locality, there being fine flax mills in this vicinity which give employment to a considerable number of hands. Each mill requires from 200 to 400 acres of land to grow the flax.

Westminster, Middlesex: Flax was a fine crop, but it is not in favor with our farmers as it leaves nothing to return to the soil, and often leaves the land foul with mustard or charlock. It is good only for toning down new land that is too rich for cereals.

Nissouri, E., Oxford: There is considerable flax grown in this locality, but the price is very low considering the work and the exhausting nature of the crop, for even the roots are not left in the ground.

Zorra, E., Oxford: A large area of flax is grown, and on certain kinds of land pays well. It is mostly raised on strong mucky clay lands and sold by the ton, straw and all, or else the land is rented for the crop.

Wallace, Perth: Flax is grown to a considerable extent in this township, and to the injury of the land. Perhaps one-half of the farmers grow it. It does not pay and it is ruinous to a farm to grow much of it.

Nichol, Wellington: A large amount of flax is grown in this township. It gives a yield of from one and a half to three tons per acre of seed and straw fibre, and selling at from $10 to $11.50 per ton, and although to a great extent it takes from the productiveness of the land, yet if not entered upon too heavily by each one is a great help in bringing in ready cash at a scarce time. There is no cheese factory here, and the principal staples are beef, lambs and pork, all of which tend to the improvement of the land.

Peel, Wellington: Flax is grown extensively in this township and is usually a heavy crop, the soil being well adapted to its growth.

Waterloo, Waterloo: Flax is raised here and pays very well, as people can sell it for $10 to $12 a ton. Some have raised over two tons to the acre, but had to pay $5 for the pulling.

Monck, Muskoka: Have raised some flax this year and had a splendid crop. I believe it would pay farmers to grow flax for feed for almost any kind of stock.

St. Joseph's Island, Algoma: Flax is grown by nearly everyone—that is enough for home use. The straw is of no value here. I do not know what the average yield of seed might be, but last year I had thirteen bushels of seed from one acre.

SORGHUM.

Pelee Island, Essex: Sorghum was sown more freely than in years past, and owing to the dry and hot weather in November while the seed was filling and the sucrose developing, we had a remarkably good crop and an excellent syrup. There was a large yield. I have made sorghum syrup for ten years, and I never knew a season when the yield was greater or the quality better.

Colchester S., Essex: Nearly every farmer raises a small patch of sorghum for family use. When the cane is fully ripe, which may be known either by the seed or the cane itself turning yellow, it is stripped of leaves and then cut and tied in bundles and taken to the cane mill where it is manufactured into syrup. The crop here this year was a very good one, and fully ripened before any frost came.

Gosfield N., Essex: Nearly all the farmers raise enough cane to make sufficient sorghum syrup for home use. The quality this year is not as good as it sometimes is. The lack of rain at the proper time was, I think, the cause.

Camden, Kent: Sorghum can be grown as easily as corn, and if properly manufactured makes a good syrup. We have a good factory in Dresden. The farmer grows the cane and pays 20c. a gallon for getting the syrup made. I think it would pay every farmer to grow at least enough for thirty gallons.

Harwich, Kent: There is a good deal of sorghum grown in a small way here. That is, a great many farmers are growing small quantities which they take to a factory near Blenheim and get it manufactured into syrup for their own use.

Raleigh, Kent: Since the introduction of improved methods in its manufacture there has been a visible increase in area, but a much greater improvement will have to take place in its manufacture before it becomes popular.

HOPS.

Hallowell, Prince Edward: Hops were a good crop, and the area was larger than last year. Most of them were sold at a moderate price.

Plantagenet S., Prescott: A large quantity of hops are grown here, but just now the prices are low.

TOBACCO.

Pelee Island, Essex: Tobacco has been grown to a limited extent and did well this year, as indeed it invariably does here.

MISCELLANEOUS.

Yarmouth, Elgin: A small louse seemed to be very numerous on the apple blossoms this spring. It spins a web around the bud and keeps it from bursting out. It has been the same for the last three years, and there has been a scabby crop.

Crowland, Welland: The present condition of the farming industry is not very profitable, more especially this season. Last year we had a ready market for all dairy produce, chickens, lambs and calves being bought up at our doors and taken to Buffalo. But the duty has almost closed that market against us.

Stamford, Welland: What the farmers of to-day need is more knowledge of those laws of nature upon which the farming industry is based. To teach these to men who have run in one rut for years is a difficult, if not a hopeless task. Probably the best way is to reach them is through the farmers' institutes. The greatest improvement can be made by training the rising generation in the way they should go; make every inducement possible for them to attend the Ontario Agricultural College, and let the college employ agents to go out and "compel them to come in."

Hullett, Huron: All coarse grains should be consumed on the farm, as the great drawback to Canadian farming is a lack of good barnyard manure in order to retain and improve the condition of the soil. But before the full benefit can be derived from manure, the land ought to be well drained. Wet land in the spring especially is one of the great hindrances to successful agriculture. Wherever the water washes off the face of the land a considerable amount of the strength of the manure goes with it, but where the soil is drained and the water filters through it and is carried off by under-drains there is no loss of manure. With underdraining the land is also a week or ten days earlier for seeding.

Gainsboro', Lincoln: We need a change in the manner of road-making and statute labor. Township councils should also appoint inspectors to destroy noxious weeds and black-knot. There is too often a fear of offending men who keep dirty farms.

Whitchurch, York: During the last few years the jack rabbit has been increasing fast, and I fear that in a little while they may become a serious pest.

Hallowell, Prince Edward: Fancy peas are very much grown in this locality for seedsmen for shipment to the American market. Considerable sweet corn is also grown for canning purposes.

Camden, Addington: The only suggestion I can offer to improve the condition of farmers is to till only what we can thoroughly manure by the yield of the barnyard. Run the balance into mea low and pasture for dairy cows, dry stock and sheep.

Plantagenet S., Prescott: Farmers owe a debt of gratitude to the local and federal governments for imparting knowledge relating to their vocation, and more particularly to the provincial government for distributing bulletins to all members of farmers' institutes These bulletins and reports, I am glad to say, are perused by them to some effect.

Otonabee, Peterborough: Several farmers are sowing a quarter of an acre of sugar beets so as to test the quality of the soil in this section for the growing of that crop.

Minden, Haliburton: This was a poor sap year, and not much maple sugar was made.

Nipissing, Parry Sound: We have good crops of oats and peas, several farmers having raised fully 1,000 bushels of the former cereal, and one young man has grown 1,500 bushels of oats and 900 bushels of peas. A considerable portion of our barley did not ripen on account of the early drouth. The growth of hay has been very fair, and much of the timothy is excellent. Many farmers here are growing roots, and great crops of Swede turnips are reported. Potatoes are abundant. Dairying is developing to a most encouraging extent. One farmer has ten milch cows and twenty head of other stock. Sheep are scarce, but we have some first-class swine. During last summer and fall your correspondent killed fifteen beef cattle and purchased nine head. My five acres of yellow Nile or Egyptian oats averaged 45 bushels to the acre, with four feet of straw. We threshed out 2,000 pounds of superior timothy seed mixed with a little clover.

STATISTICS OF

THE WEATHER AND THE CROPS

THE WEATHER.

TABLE I. Showing for each month the highest, lowest, mean highest, mean lowest, and mean temperature at the principal stations in Ontario in 1891; also the annual mean for each station.

	Temperature.	Saugeen.	Birnam.	London.	Woodstock.	Stoney Creek.	Toronto.	Lindsay.	Gravenhurst.	Ottawa.	Rockliffe.
		°	°	°	°	°	°	°	°	°	°
January.	Highest	42.0	44.4	44.0	44.0	53.0	41.9	40.2	47.0	35.5	34.0
	Lowest	−3.0	2.3	2.0	2.1	3.0	−2.0	-11.8	-22.2	-19.0	-38.0
	Mean highest	30.8	30.3	31.0	31.1	33.7	30.1	26.2	26.6	21 6	20.3
	Mean lowest	16.8	18.5	18 5	15.7	21.1	16.6	8.1	9.3	6.1	−1.0
	Monthly mean	22.60	24.40	26.00	25.14	27.48	24.15	18.07	18.05	14.48	8.30
February.	Highest	50.0	50.1	49 0	48.7	53.0	49.0	44.1	52.0	43.5	45.0
	Lowest	−2.5	3.8	3.0	1.2	4.0	2.1	-12.4	-17.0	-27.0	-35.0
	Mean highest	34.4	33.8	35.7	34.9	37.5	34.8	31.7	31.0	24.9	24.1
	Mean lowest	17.5	23.7	21.9	18.6	23.6	20.8	12.4	8.7	7.1	−3 9
	Monthly mean	24.60	28.44	28.82	28.11	31.28	28.02	21.50	19.89	15.14	7.90
March.	Highest	51 0	51.3	54.0	49.0	54.0	52.1	52.7	51.0	51.9	55.0
	Lowest	-1.8	−2.0	−5.0	−8.0	−1.0	4.7	−5.0	-23.2	-17.1	-30.0
	Mean highest	35.2	34.1	35.2	33.9	36.6	35.0	33 0	33.8	32.3	33.9
	Mean lowest	18.7	20.8	20.4	18.2	24.7	22.5	16.2	11.4	16 3	6.2
	Monthly mean	25.30	27.45	28.98	27.63	30.71	28.81	25.01	24.13	24 90	19.20
April.	Highest	77.0	78.6	78.0	76.5	80.0	77.5	78 8	75.0	80 5	81.0
	Lowest	14.1	19.1	19.2	18.0	22.0	20.5	13.9	8.6	22.4	8.0
	Mean highest	52.3	54.1	37.6	54.9	55.5	52.1	53.5	49.6	52.3	52.0
	Mean lowest	32.5	35.0	35.0	32 7	39.5	34.8	31 6	29 3	33.8	27.2
	Monthly mean	40.50	44.53	47.24	44.81	47.47	43.24	41.93	39.77	42.94	37.30
May.	Highest	80.0	80.9	81.0	80.2	84.0	78.0	84.6	82.0	84.9	83.0
	Lowest	25.6	24.0	28.1	22.2	32.0	30.2	26.2	28.0	29.0	24.0
	Mean highest	61.9	64.0	67.1	64.9	67.0	62.1	66.7	62 9	66.1	66.5
	Mean lowest	38.4	39.2	39 5	38.0	43.8	40.9	38.6	38.7	40.4	33.7
	Monthly mean	48.00	51.61	56.17	52.75	54.99	51.51	52.10	50.65	53.21	48.40
June.	Highest	84.8	87.7	86.3	87.6	90.1	84.7	88.8	88.3	88.2	89.2
	Lowest	31.6	36.9	35.0	34.1	36.0	42.5	37.0	34.0	38 8	30.0
	Mean highest	75.5	78.1	79.8	77.3	77.5	74.6	78.2	77.2	79.1	79.9
	Mean lowest	51 7	53.1	54.2	52.3	56.0	54.3	50.7	51.0	53.8	33.4
	Monthly mean	62.60	65.61	70.38	65.63	66.88	64.34	64.69	64.41	66.48	63.10
July.	Highest	89.0	87.1	87.0	88.8	91.0	83.9	84.8	90.0	87.0	91.0
	Lowest	42.3	34.0	39 0	39.0	47.0	45.0	37.7	40.1	41.0	38 0
	Mean highest	74.8	74.8	75.1	75.2	77.9	73.6	74.2	74.2	74.7	74.6
	Mean lowest	52.9	52.0	51.6	50.5	56.5	54.7	51.5	53 0	54.1	50.8
	Monthly mean	61.30	63.44	66.79	63.84	67.70	63.69	62.35	62.73	64.15	61.00
August.	Highest	90.2	94.4	94 0	89.0	93.0	89.6	90.0	84.0	89.5	88 0
	Lowest	45.4	41 6	40.0	39.7	46.0	46.1	38.0	36 0	43.9	38.0
	Mean highest	77.6	76 3	77.4	76.9	79.2	75.0	77.5	74.6	76.4	75.4
	Mean lowest	55.6	55.1	54.4	52.5	59.0	57.1	52.4	51.4	56.0	50.8
	Monthly mean	63.01	65.70	67.95	65.66	68.08	65.56	64.21	62.57	65.44	59.88
September.	Highest	89.0	84.9	87.0	86 5	90.0	87 5	90.6	85.0	89.0	88.0
	Lowest	38.6	38.7	35.0	36.5	38.0	41.9	36.8	35.0	36.8	36 0
	Mean highest	76.4	72.2	75.3	74.8	76.6	72.5	74.5	74.0	73.6	73.7
	Mean lowest	52.9	52 5	51.1	49.7	56.7	53.5	50.0	50.8	51.0	47.3
	Monthly mean	60.31	62.37	64.46	62.54	64.78	62.49	60.78	60.45	61.55	55.55
October.	Highest	84.0	78.9	80.0	80 8	85.0	80.7	83.0	82.0	85.0	85.0
	Lowest	25.1	25.5	21 0	17.9	25.0	21.6	17.7	18.0	22.5	17.0
	Mean highest	58.4	55.0	57.1	56.6	60.2	56.1	55.9	61.6	53.9	53.7
	Mean lowest	38.7	39.5	37.4	35.0	41.4	39.1	34 5	35.3	35.4	31.8
	Monthly mean	45.73	47.25	48 62	46.94	50.25	47.91	44.08	46.59	44.23	39.50
November.	Highest	64.0	63.9	65.0	65.0	70.0	58.3	61.8	68.0	61.8	56.0
	Lowest	11.5	1 7	9.2	6.0	4.0	7.5	−3.3	−2.8	-1.5	-7 0
	Mean highest	43.9	40.8	43.8	42.5	48.1	43.0	41.3	47.2	41.7	38.4
	Mean lowest	30.8	29.6	30 0	26.8	32.7	30.3	25.0	26 0	25.2	22.0
	Monthly mean	36.00	35.23	36.99	35.68	40.47	37.05	33.60	33.97	33.29	29.20
December.	Highest	51.2	53.8	55.0	55.5	58.0	49.0	50.9	56.0	49.0	49.0
	Lowest	9.6	10.2	8.2	2.5	10.0	3.4	−3.5	−2.0	−4.5	-10.0
	Mean highest	30.6	38 0	40.1	40.3	43 1	40.0	36.9	38.7	35 5	35.7
	Mean lowest	27.5	26 4	25.4	23.9	29.6	27.0	22.5	22.7	20 9	18.1
	Monthly mean	32.99	32.17	33.13	32.88	36.34	33.64	29.47	30.60	28.66	25.53
	Annual mean	43.60	45.68	47.96	45.97	48.87	45.87	43.15	42 82	42.87	37.90

THE WEATHER.

Table II. Showing for each month the annual average of the highest, lowest, mean highest, mean lowest and mean temperature at the principal stations in Ontario derived from the ten years 1882-91; also the average annual mean at each station for the same period.

	Temperature.	Saugeen.	Birnam.	London.	Woodstock.	Stony Creek.	Toronto.	Lindsay.	Gravenhurst.	Ottawa.	Rockliffe.
		°	°	°	°	°	°	°	°	°	°
January.	Highest	45.5	46.8	47.3	47 0	52 4	44.8	42.5	43.4	40.1	39.0
	Lowest	−9.6	−9.5	−7 8	-13 5	−4 0	9.3	-23.8	-28 1	-22.9	-37.0
	Mean highest	27.2	26.1	27.9	27.6	36.5	27.9	23 2	23.3	18.8	17.7
	Mean lowest	11.6	13 3	13.2	9.7	23.6	12.7	5 3	2 6	0.3	−7 0
	Monthly mean	19 80	19.67	21.51	20.07	23.13	20.88	14.57	13.92	10.20	6.04
February.	Highest	46 6	49.4	47.7	47.5	48.6	44.7	42.8	43.7	39.8	42.5
	Lowest	−8.9	-14.2	-10.0	10.9	-5.2	−7.7	17 2	-23.1	-22.9	-34.3
	Mean highest	28.1	27.9	29.7	29 8	37.7	29 6	26.3	26.0	21.2	21.3
	Mean lowest	11.6	13.0	12 8	10.7	23 0	13.6	5.8	4.2	1.6	−5 0
	Monthly mean	19.72	20.44	21 86	21.51	23.44	22.09	16.45	15.77	12.06	8.47
March.	Highest	49.5	54.6	53.0	52.8	55 0	50.3	47.3	47.0	44.6	47.4
	Lowest	6.3	−8.7	−6.6	−7 3	1.8	6 6	-12.5	17.7	-12.7	-26.3
	Mean highest	32 5	33.5	34 3	34.3	36 9	33 8	31.6	32.0	30.0	30.8
	Mean lowest	15.7	17.6	17.5	16.0	21.0	19.4	12.4	10.4	11 6	3.7
	Monthly mean	23.47	24.93	26.66	26.12	28 69	26.67	22.24	21 56	21 13	17.90
April.	Highest	74.0	78 9	77.3	76.8	79 0	70 0	74 8	70.3	73 6	73.8
	Lowest	12.8	14 3	17.5	15.7	23 1	20 8	12.1	8:8	12 3	3.9
	Mean highest	48 4	52.4	50.8	52.7	55.6	49.4	50.2	48.2	48.7	48.4
	Mean lowest	29 9	32.1	32.1	30 4	38.0	32.4	28 9	27.4	29 1	24.2
	Monthly mean	38.58	41.13	43.28	41.96	43.17	40.91	39.22	37.73	39 78	36.41
May.	Highest	78 7	82 8	80.4	80.2	82.6	76.0	81.7	81 9	81.5	85.0
	Lowest	27.2	27.2	30.3	28.1	35.7	31.1	27 0	26.4	29.5	23.4
	Mean highest	60 0	65.4	65.0	63.8	64.3	61.1	64.7	63.1	65.5	64 1
	Mean lowest	39 8	42 2	43.4	41.1	43 6	42.6	40 5	41.3	43 1	37 1
	Monthly mean	49.18	53.77	54.93	53 44	53.61	51.89	52.29	51.61	55.02	50.60
June.	Highest	84.8	87.7	86.3	87.6	90.1	84.7	88.8	88.3	88.2	89.2
	Lowest	36.7	35.8	39.1	37.5	44.9	42.3	37.2	36 3	40.1	33.5
	Mean highest	70.3	76.0	74.8	76.0	78.2	72.6	75.9	74.6	76.0	75 0
	Mean lowest	49.7	52.2	53.4	51 6	57.6	52 8	50 3	50 9	53.2	46.1
	Monthly mean	59.74	64.09	65.12	64.56	65.19	62.59	63.07	62.65	65.52	61.00
July.	Highest	86.3	90.5	89.1	89 2	93.6	88.0	90.3	88.5	89.6	90.4
	Lowest	41 0	40 4	44.9	44 0	50.9	47.9	42.5	42 9	46.7	40.3
	Mean highest	73 8	79.5	77.8	79.0	80 6	76.8	79.0	77.4	78.3	77.1
	Mean lowest	53 9	54.8	56.1	54.2	58.9	57 2	53.4	54 9	56 8	52.1
	Monthly mean	63.52	67.18	68.10	67.71	69.94	67.11	65.97	65.98	68.31	64.09
August.	Highest	86.2	90.5	88.3	89.5	91.9	86 8	90.1	87.7	88.6	88 9
	Lowest	40 3	38 6	40.0	41.3	47.5	45.7	38 1	39.6	42.2	37.7
	Mean highest	73.0	76.6	75.3	76.9	77.8	74.6	76.2	74.8	75 4	74.3
	Mean lowest	53 6	53 0	53.8	52.3	58.3	56.2	51.7	52.7	53.9	50.1
	Monthly mean	62.54	64.81	65.32	64.78	67.86	65.30	63.32	63 10	65.33	60.84
Septemb'r.	Highest	84.6	86.8	84.6	86 5	88.9	82.0	86.4	83 6	83.6	84.2
	Lowest	32.3	32.5	32.8	30.9	37.0	36.9	29 9	31 6	31.4	29.7
	Mean highest	67 7	70.6	69 4	70.4	74.0	67.9	69 4	68.7	67.9	67 3
	Mean lowest	47 6	48.5	49.1	46.1	53 2	49.6	44 9	45.9	46 5	42.8
	Monthly mean	56.64	59.63	59.36	58.68	60.98	58.72	56.42	56.49	57.41	53.80
October.	Highest	73.3	76.3	73.6	74.7	74.7	70 8	74.2	72.2	69.5	72.3
	Lowest	22.0	22 4	23.1	21.4	25 4	25 0	18.6	20.3	21.6	16.6
	Mean highest	54.8	55.8	55.1	55 6	59.3	54.1	53.9	54.6	51.5	51.4
	Mean lowest	37.9	38.7	37 4	35.9	42.7	38.7	34.5	36 0	34.4	31.9
	Monthly mean	45.91	47.27	46.53	46.18	48.26	46.70	43.30	44.25	43.73	40.66
Novemb'r.	Highest	61.8	63.9	62.5	62.7	65 6	59.6	61.1	61.2	58.6	56.4
	Lowest	11 4	12.7	13 4	9.7	16 0	12.7	2.5	5 3	3.6	−3.6
	Mean highest	43.0	42.8	43.9	42.9	47.5	42 8	40.3	41.6	38.5	36.8
	Mean lowest	29.4	30.4	29.6	27.2	33 1	30.2	25.2	24.8	24.8	21.5
	Monthly mean	35.60	36.59	37.13	35.93	39.20	36.74	32.50	33.13	32.11	29.12
Decemb'r.	Highest	49.6	49 4	50 5	48.4	53.2	46.7	44 2	45.6	42.4	43.2
	Lowest	−1.4	2.0	−2.7	−5.8	4 1	−1.2	13 9	12.1	-15 3	23.8
	Mean highest	33.5	32.6	34.1	32 9	38.3	33 7	29.1	30 0	25 0	25.2
	Mean lowest	20.6	20.6	20.1	17.8	24.7	20 8	13.4	13.9	8.9	5.1
	Monthly mean	27.04	26 59	27.84	26.48	30.69	27.73	21.87	22 77	17.74	15.22
	Annual mean	41 81	43 84	44 80	43 95	46 18	43.94	40 94	40.75	40.75	36.97

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TABLE III. Monthly summary of bright sunshine at the principal stations in Ontario in 1891, showing the number of hours the sun was above the horizon, the hours of registered sunshine, the total for the year, and the average derived from the ten years 1882-91.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total for the year.
	hrs.	hrs	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.	hrs.
Hours of sun above horizon.	285.7	*291.4	369.9	406.4	461.1	465.7	470.9	434.5	376.3	340.2	286.9	274.3	4463.3
Woodstock.. 1891...	61.4	74.0	99.3	186.1	245.4	247.3	275 7	222.0	231.0	143.9	56.3	92.4	1934.8
1882 91	60.4	79.0	135.6	191.5	206.9	240.2	268.9	229.7	201.6	126.7	70.1	57.8	1868.4
Toronto.. 1891...	69 6	104 3	141.0	195.3	236.0	242 4	247.7	220.5	251.7	173.5	77.5	105.9	2065.4
1882 81	75.9	93.2	149.7	196 3	222.1	261.2	285.3	250.4	216.4	138.6	80.5	56.1	2025.7
Barrie... 1891...	59.3	70 6	122.8	176.1	213.8	234.4	231.0	205 9	220 3	148.4	47.2	72.9	1802.7
1882 91	52.8	65.6	126.6	167.2	197.1	227.2	253.1	213.8	152.1	94.9	48.3	37.0	1635.7
Lindsay.. 1891..	72.5	99 9	165 5	210.5	227.4	271.7	242.4	207.6	237.6	171.9	61.7	87.2	2055.9
1882 91	75.2	96.3	160.0	206.0	219.4	258.9	276.7	233.3	208.4	131.3	74.7	58.1	1998.3
Kingston 1891...	50.2	100.3	166.4	185 3	225.2	231.6	249.2	230.7	214.5	163.0	104.0	89 9	2010.3
1882-91	66 5	98.9	154 9	193.6	216.9	243.3	267.1	246.3	200.5	125.7	77.1	67 9	1958.7
Average of five stations 1891...	62.6	89 8	139.0	190.7	229 6	245.5	249.2	217.3	231.0	160 1	69.3	89.7	1973.8
1890...	50 5	69 0	142 1	210.0	174 5	254.7	280 4	234.6	195 2	85.1	93.8	77.9	1867.8
1882 91	66.2	86.6	145.5	190.9	212.5	246.1	270.2	234.7	195.8	123.4	70.1	55.4	1897.4

* The average possible sunshine for February, 1882-91, was 293.6 hours.

TABLE IV. Monthly summary of inches of rain and snow precipitation in the several districts of Ontario in 1891; also the average derived from the ten years 1882-91.

Districts.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total for the year.
West and south-west:	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
Rain..... 1891...	1.59	2.73	1.48	1 74	1.48	1.98	3.17	3.78	2.22	2.56	4.47	2.21	29.41
1882 91	1.40	1.79	1.26	1.71	3.16	3.28	2.58	2 79	2.33	2.73	2.64	1.53	27.20
Snow..... 1891...	8.0	6.2	13 4	0.1	*	.....	....	....	....	.. .	8.2	4 0	39.9
1882 91	15.9	10.7	11.0	3.3	0.1	.....	....	....	....	0.2	6.4	14.3	61.9
Northwest and north:													
Rain..... 1891..	0.93	1.28	0 50	2.04	0.66	1.11	3.87	4.18	2.34	2.32	4.40	1.18	24.81
1882 91	1.09	0.78	0 81	1.45	2.44	2.72	2.62	2.74	2.91	2.80	2.28	1.20	23 84
Snow..... 1891..	16 4	18.4	24.8	1.7	*	.....	....	....	....	*	11.5	9.1	81.9
1882 91	28.4	22.0	15.5	3.9	0.5	... .	....	.. .	....	1.3	13.6	21.0	106.2
Centre:													
Rain..... 1891...	1.84	1.72	1.43	1.81	0.62	2.49	2.84	4.14	2.07	1.63	3 84	2.07	26.50
1882 91	1.39	1.37	1.12	1.60	2.52	3.09	2.35	2.50	2.38	2.36	2.46	1.44	24.58
Snow..... 1891...	13.2	12.9	17.7	0.2	*	.....	....	....	....	.. .	5.0	7.1	56.1
1882-91	17.9	11 9	10 8	3.1	0.1	.....	....		. ..	0.2	5.4	11.6	61.0
East and north-east:													
Rain..... 1891...	1.11	1.35	2.44	1.49	1 53	1.76	4.12	3 64	1.48	1.85	2.93	1.92	25.62
1882-91	1.06	0.90	1.00	1.41	2.41	2.77	3.01	2.73	2.46	2.07	2.05	1.12	22.99
Snow..... 1891...	18.1	15.5	23.1	0.8	*	....	....	....	....	*	4.9	5.4	67.8
1882-91	22 0	18.5	15.1	4.7	0.3	....	....	....	....	0.4	8.7	13.8	83.5

* Not measurable.

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TABLE V. Summary of the total fall of rain and snow, and of the number of days on which rain or snow fell in Ontario during the years 1890 and 1891 at stations reporting for the whole year and the average for the province.

Stations.	Observers.	Rain.				Snow.			
		1890.		1891.		1890.		1891.	
		Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.
ESSEX :									
Cottam	W. E. Wagstaff	33.36	114	26.30	92	33.7	25	28.3	23
Pelee Island	J. Quick	35.47	59	26 07	45	35.0	7	35.0	8
Kingsville	W. Howlett	29.95	106	24.37	107	9.5	6	20.3	26
KENT :									
Blenheim	W. R. Fellows	37 08	100	31.28	82	39.3	17	27.8	21
Dealtown	S. J. Pardo	38 44	100	29.49	106	21 8	22	15.3	20
Ridgetown	T. Scane	36.47	132	30.22	95	48.7	35	40.0	41
ELGIN :									
Cowal	S. Maccoll	31 55	95	29 44	78	32.0	27	33.3	30
Lyons	Wm. McCredie	35 06	91	30 24	80	42.1	20	40.5	23
Port Stanley	M. Payne	33.74	164	30.17	144	64.1	67	51.0	50
NORFOLK :									
Port Dover	J. L. Morgan	34.31	160	23 77	132	34.7	48	46.1	63
WELLAND :									
Niagara Falls, S.	E. Morden	35.75	110	31.21	97	35.7	28	39.9	24
LAMBTON :									
Birnam	J. S. Mellor	32.72	105	33.21	98	63.4	34	55 5	34
Oil Springs	A. Smyth	25 07	75	18 89	68	31.5	21	27.0	30
Sarnia	Wm Mowbray	29.53	79	27 03	56	33.5	12	42 5	14
Thedford	Martin Wattson	35.63	104	33.02	87	48.5	31	53.0	32
Watford	D. Ross	29.39	75	33.66	63	.....	...	.....	...
Wyoming	J. Osborne	30.77	96	29.14	80	12.5	8	18.0	10
HURON :									
Goderich, L. H.	R. Campbell	24.01	84	24.78	68	83.5	38	72 5	28
Sunshine	G. Hood	27.34	99	30 87	87	60.7	44	69.8	51
Zurich	G. Hess	36.76	101	35.73	94	71.2	33	49.3	29
BRUCE :									
Lucknow	M. Macdonald	28 93	129	31.91	105	85.8	70	72.2	70
North Bruce	J. B. Muir	25 50	120	30.43	96	62.4	53	39.9	49
Point Clark	J. Ray	24.56	52	31.74	51	54.0	26	22.0	6
Saugeen	Mrs. J. R. Stewart	25.43	140	27.26	116	100.8	81	106.4	77
GREY :									
Bognor	C. H. Heming	27.37	124	30.06	122	111.8	56	135.5	62
Durham	J. Gunn, M.D	26.48	113	24.74	95	144.0	80	170.3	74
Owen Sound	John McLean	28.35	79	30.59	61	103.0	38	103 3	30
Presque Isle	J. McKenzie	31.20	93	36.21	86	82.9	43	95.0	38
SIMCOE :									
Barrie	J. J. Gillam	29 94	116	23.01	100	64 8	61	88.5	56
Coldwater	J. B. Lozonby	26 41	97	27.50	88	103.9	52	152.8	59
Orillia	H. A. Fitton	23.16	104	20.52	84	96.0	48	124.9	77
MIDDLESEX :									
Coldstream	Daniel Zavitz	31.98	96	36.32	91	50.5	27	41.0	22
London	J. S. Dewar	30 94	109	37.33	124	71.0	52	48.9	63
Wilton Grove	H. Anderson	30.75	91	26.81	63	48 8	19	35.0	26
OXFORD :									
Princeton	D. Beamer	27.28	105	25.14	95	39.5	23	41.4	24
Woodstock	Prof. Wolverton	33.53	111	32.77	115	74.6	41	55.7	32
BRANT :									
Paris	John Kay	33.47	115	31.60	93	25.5	19	30.1	20
St. George	Dr. Kitchen	33.63	121	30.64	103	44.8	36	35.7	24
PERTH :									
St. Marys	J. Thomson	34.90	97	21.97	83	57.5	24	76.6	25
WELLINGTON :									
Elora	T. Connon	33.97	78	30.91	59	39.2	33	32 0	30
Guelph O. A. C.	Prof. J. H. Panton	16.49	60	26.47	103	17.9	33	53.2	62

TABLE V. THE WEATHER.—*(Continued.)*

Stations.	Observers.	Rain.				Snow.			
		1890.		1891.		1890.		1891.	
		Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.
DUFFERIN:									
Orangeville	N. Gordon	31.87	65	28.38	67	59.5	23	80.2	32
WENTWORTH:									
Stony Creek	C. F. Van Wagner	37.86	87	33.66	81	25.0	21	40.2	24
HALTON:									
Georgetown	J. Barber, jr	28.72	46	25 40	132	54.7	59	77.0	70
Nelson	J. Ireland	30 61	121	35.42	77	47.2	43	75.3	33
YORK:									
Aurora	Rev. R. W. Amos	25.56	90	21.43	77	57.7	42	50 7	41
Scarborough	R. Martin	30.42	124	27.49	102	42 2	50	31.7	41
Sharon	J. D. Graham	23.32	114	26.14	109	61.6	52	63.0	49
Toronto	Observatory	32.11	145	26.74	125	52.6	81	47.8	70
LEN'X & ADDINGTON									
Denbigh	J. Lane	25.11	63	22.65	56	96.5	38	74.1	29
FRONTENAC:									
Kingston	A. P. Knight	26.29	131	24.94	143	69.1	71	51.3	60
GLENGARRY:									
Alexandria	J. Smith	30.10	125	27.42	106	97.2	71	63.6	60
CARLETON:									
Ottawa	W. T. Ellis	25.25	120	30.40	124	71.3	68	75.0	48
RENFREW:									
Clontarf	A Schultz	24.40	93	25 47	97	89.1	68	85.7	60
Renfrew	A. F. Wright	17.15	76	21.14	79	67.0	38	47.1	42
Rockliffe	C. McIntyre	16.75	75	23.21	99	81.7	58	98.5	53
LANARK:									
Oliver's Ferry	W. J. McLean	25.36	78	24.40	77	54.0	15	40.5	21
VICTORIA:									
Lindsay	Thos. Beall	24.81	114	24.63	119	77.5	80	95.4	74
PETERBOROUGH:									
Ennismore	Thos. Tellford	30.04	109	19.79	67	59.5	45	54.0	32
Norwood	Rev. J. Carmichael	21.96	64	21.76	70	47.8	28	63.0	24
HALIBURTON:									
Haliburton	C. R. Stewart	21.32	94	21.55	95	59 3	66	61.8	60
HASTINGS:									
Bancroft	John Cleak	21.93	87	22.44	82	101.0	48	100 2	54
Deseronto	J. Russell	21.02	85	31 57	93	53.1	34	53.4	36
Shannonville	John Kemp	22.22	55	21.09	60	50.0	21	47.0	18
MUSKOKA:									
Bala	E. B. Sutton	30.69	133	27.12	112	74.6	58	82.6	67
Beatrice	J. Hollingworth	27.38	104	30.66	94	89.8	28	98.9	47
Novar	C. J Tisdall	36.24	117	28.92	94	89.8	80	102.0	71
Gravenhurst	T. M. Robinson	21.61	84	24.92	92	83.0	45	74.8	53
PARRY SOUND:									
Lynch Lake	G. Ambury	30 38	115	21.85	87	153.1	73	99.5	65
Parry Sound	Rev. R Mosely	29.37	127	26.51	116	100.7	73	95.1	54
Spruncedale	A Kirkam	29 39	68	35 01	71	76.3	28	90.0	32
Upland	P. Macdonald	38.85	113	27.93	87	108 7	72	106.4	80
ALGOMA:									
Cartier	Agent C. P. R	19.12	70	19.90	55	132.0	56	81.0	37
Port Arthur	W. P. Cook	16.49	74	17.56	79	36.8	50	29.6	44
Savanne	Agent C P. R	9.94	45	22.29	57	95.0	51	82.0	43
White River	Agent C. P. R	13.57	93	14.43	80	116.7	107	21.0	82
Average for the province		28·27	99	27.34	90	65.5	44	63.5	43

THE WEATHER.

TABLE VI. Comparative Meteorological Register for the seven years 1885-91, as recorded at Toronto Observatory, in Latitude 43° 39.4′ N. and Longitude 5h. 17m. 34.65s. W.

Register.	1891.	1890.	1889.	1888.	1887.	1886.	1885.
Average temperature	45.87	45.02	45.44	42.70	44.14	43.71	41.57
Difference from average (51 years)	+ 1.74	+ 0.89	+ 1.31	— 1.43	+ 0.01	— 0.42	— 2.56
Thermic anomaly (Lat. 43° 40′)	— 5.15	— 6.00	— 5.58	— 8.32	— 6.88	— 7.31	— 9.45
Highest temperature	91.9	89.4	88.7	92.0	97.2	89.5	88.6
Lowest temperature	— 2.0	— 2.7	11.3	16.1	—16.6	—22.8	—16.1
Annual range	93.9	92.1	100.0	108.1	113.8	112.3	104.7
Average daily range	16.45	16.22	15.55	16.55	17.12	16.53	16.85
Greatest daily range	37.8	36.0	42.8	37.7	34.0	32.6	39.2
Average height of bar. at 32° Fah.	29.6385	29.6313	29.6177	29.6448	29.6329	29.6255	29.5933
Difference from average (50 years)	+0.0198	+ .0126	— .0010	+ .0261	+ .0142	+ .0068	— .0254
Highest barometer	30.266	30.334	30.365	30.432	30.607	30.283	30.300
Lowest barometer	28.536	28.762	28.582	28.793	28.704	28.752	28.714
Annual range	1.730	1.572	1.783	1.639	1.903	1.531	1.586
Average humidity of the air	75	78	77	74	75	77	77
Difference from average	— 2	+ 1	0	— 3	— 2	0	0
Average elasticity of aqueous vapour	0.267	0.272	0.271	0.243	0.261	0.260	0.249
Average of cloudiness	0.59	0.62	0.63	0.63	0.63	0.61	0.61
Difference from average (37 years)	— 0.03	.00	+ .01	+ .01	+ .01	— .01	— .01
Resultant direction of wind	N 57° W	N 48° W	N 63° W	N 59° W	N 46° W	N 56° W	N 62° W
" velocity of the wind	1.63	1.80	2.04	2.67	1.92	2.13	2.60
Average velocity (miles per hour)	7·33	9.19	9.08	9.71	9.88	9.73	9.95
Difference from average (15 years)	*	— 0.45	— 0.56	+ 0.07	+ 0.24	+ 0.09	+ 0.31
Total amount of rain in inches	26.735	32.110	24.575	22.819	17.969	27.726	26.351
Difference from average (51 years)	—0.577	+4.798	—2.737	—4.493	—9.343	+0.414	—0.961
Number of days of rain	125	145	127	133	106	112	103
Total amount of snow in inches	47.8	52.6	66.5	34.6	77.9	73.5	65.6
Difference from average (48 years)	—22.0	— 17.2	— 3.3	— 35.2	+ 8.1	+ 3.7	— 4.2
Number of days of snow	70	81	60	83	78	66	73
Number of fair days	193	159	187	175	203	196	203
Number of days completely clouded	60	68	79	58	76	74	65
Number of auroras observed	18	7	6	21	25	29	31
Possible to see aurora (No. of Nights)	212	188	169	183	180	189	195
Number of thunder storms	18	21	24	23	22	26	19
Number of fogs	38	43	34	26	39	29	30
Number of hours of bright sunshine	2065.4	1977.6	1909.2	2048.3	2063.5	2034.4	2018.3
Difference from average (10 years)	+ 39.7	— 48.1	—116.5	+ 22.6	+37.8	+ 8.7	— 7.4
Number of hours of possible sunshine	4463.3	4463.3	4463.3	4474.4	4463.3	4463.3	4463.3

*During the year 1891, the wind has been obtained from the records of the anemograph at the Island and the entries at observation hours, and no comparison has been made with the result of former years.

RURAL AREA.

TABLE VII. Showing by County Municipalities and groups of counties the Rural Area of Ontario, as returned by municipal assessors for 1891.

Counties.	Acres of assessed land.			Acres cleared.		Acres woodland.	Acres swamp, or marsh.	Per cent. cleared.
	Resident.	Non-resident.	Total occupied.	1891.	1890.			
Essex	412,671	13,492	426,163	216,029	212,120	193,283	16,852	50.7
Kent	543,228	24,150	567,378	311,695	304,453	229,556	26,217	54.9
Elgin	433,937	2,563	436,300	283,056	279,298	141,198	12,046	64.9
Norfolk	385,015	6,996	392,011	233,664	234,108	130,100	28,241	59 6
Haldimand	277,679	2,346	280,025	203,719	204,371	69,254	7,052	72.8
Welland	223,006	4,355	227,361	163,087	163,475	53,242	11,032	71.7
Totals	2,275,536	53,702	2,329,238	1,411,160	1,397,825	816,638	101,440	60.6
Lambton	636,189	24,838	661,027	318,722	306,379	313,539	28,766	48.2
Huron	788,516	6 735	795,251	569,017	563,959	137,104	89,130	71.6
Bruce	796,421	20,217	816,638	465,486	458,363	247,793	103,359	57.0
Totals	2,221,126	51,790	2,272,916	1,353,225	1,328,701	698,436	221,255	59.5
Grey	1,026,812	31,469	1,058,281	567,705	559,481	317,751	172,825	53.6
Simcoe	914,205	47,326	961,531	497,338	482,378	433,084	31,109	51.7
Totals	1,941,017	78,795	2,019,812	1,065,043	1,041,859	750,835	203,934	52.7
Middlesex	749,728	8,580	758,308	532,110	534,229	209,033	17,165	70.2
Oxford	469,023	2,941	471,964	350,103	346,886	95,612	25,449	74.3
Brant	214,278	2,031	216,309	172,462	171,136	24,005	19,842	79.7
Perth	510,548	5,115	515,663	371,368	365,633	86,473	57,822	72.0
Wellington	623,180	3,749	626,929	441,646	440,351	100,972	84,311	70.4
Waterloo	304,201	2,757	306,958	244,156	239,921	44,317	18,485	79 5
Dufferin	345,102	10,658	355,760	202,389	191,853	71,341	82,030	56.9
Totals	3,216,060	35,831	3,251,891	2,315,034	2,293,009	631,753	305,104	71.2
Lincoln	186,797	3,990	190,787	152,227	153,241	36,911	1,649	79.8
Wentworth	270,667	2,556	273,223	209,074	209,240	42,064	22,085	76.5
Halton	222,189	1,582	223,771	168,246	169,726	39,925	15,600	75.2
Peel	287,742	162	287,904	239,241	241,351	34,615	14,048	83.1
York	525,596	8,029	533,625	415,537	410,287	64,869	53,219	77.9
Ontario	487,084	14,624	501,708	346,488	340,473	84,146	71,080	69.1
Durham	365,905	2,308	368,213	273,832	272,581	70,146	24,235	74.4
Northumberland	429,147	4,876	434,023	319,902	321,327	91,263	22,858	73.7
Prince Edward	225,389	4,863	230,252	182,287	182,393	37,464	10,501	79.2
Totals	3,000,516	42,990	3,043,506	2,306,834	2,300,619	501,397	235,275	75.8
Lennox & Addington	369,594	51,814	421,408	211,127	204,917	129,801	80,480	50.1
Frontenac	579,923	94,215	674,138	219,918	219,811	319,109	135,111	32.6
Leeds and Grenville	742,808	5,243	748,051	421,463	419,125	223,902	102,686	56.3
Dundas	234,088	2,350	236,438	135,259	135,841	62,971	38,208	57.2
Stormont	247,486	6,160	253,646	122,440	117,631	111,973	19,233	48.3
Glengarry	288,448	451	288,899	149,337	147,294	117,314	22,248	51.7
Prescott	263,515	21,650	285,165	142,885	138,491	120,129	22,151	50.1
Russell	235,097	17,723	252,820	79,422	80,516	150,810	22,588	31.4
Carleton	552,860	8,961	561,821	288,668	289,943	138,551	134,602	51.4
Renfrew	885,902	29,312	915,214	267,705	262,716	564,255	83,254	29.3
Lanark	632,299	37,925	670,224	304,127	285,151	258,918	107,179	45.4
Totals	5,032,020	275,804	5,307,824	2,342,351	2,301,436	2,197,733	767,740	44.1
Victoria	545,146	26,420	571,566	249,405	244,356	186,313	135,848	43.6
Peterborough	509,277	27,482	536,759	226,298	232,351	252,250	58,211	42.2
Haliburton	541,729	21,429	563,158	31,508	29,907	498,861	32,789	5.6
Hastings	916,538	64,308	980,846	336,737	332,858	505,608	138,501	34.3
Totals	2,512,690	139,639	2,652,329	843,948	839,472	1,443,032	365,349	31.8
Muskoka	443,665	70,379	514,044	54,721	55,708	401,067	58,256	10.6
Parry Sound	464,407	44,481	508,888	48,140	41,985	431,468	29,280	9.5
*Nipissing	124,970	49,723	174,693	11,640	11,333	157,535	5,518	6.7
†Algoma	357,555	103,287	460,842	50,391	46,752	346,868	63,583	10.9
Totals	1,390,597	267,870	1,658,467	164,892	155,778	1,336,938	156,637	9.9
The Province.. 1891	21,589,562	916,421	22,535,983	11,802,487	.....	8,376,762	2,356,734	52.4
The Province.. 1890	21,455,126	963,155	22,418,281	.....	11,658,699	8,343,447	2,416,135	52.0

* Not including the organised township of McKim (since returned at 20,823 acres).
† Not including the acreages of the organised townships of Keewatin, Neebing, Rat Portage and Shuniah.

AREA AND PRODUCE—FALL WHEAT.

TABLE VIII. Showing by County Municipalties and groups of Counties the area and produce of Fall Wheat in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.
Essex	37,930	952,013	25.1	25,954	428,241	16.5	31,808	643,570	20.2
Kent	62,322	1,634,069	26.3	48,259	965,180	20 0	59,549	1,207,528	20 3
Elgin	42,621	1,224,223	28.7	39,096	833,651	21 4	43,353	881,648	20.3
Norfolk	34,006	911,361	26.8	30,579	617,696	20 2	32,856	617,151	18.8
Haldimand	32,265	709,830	22 0	29,515	442,725	15.0	32,689	546,338	16.7
Welland	22,148	504,974	22.8	20,313	345,321	17.0	22,229	373,334	16.8
Totals	231,292	5,940,500	25.7	193,716	3,635,817	18.8	222,484	4,269,869	19 2
Lambton	40,642	1,081,077	26.6	29,998	545,964	18.2	35,067	691 500	19.8
Huron	55,265	1 519,788	27.5	44,978	989,516	22 0	64,083	1,294,468	20 3
Bruce	36,119	937,482	25 9	32,789	711,521	21.7	45,676	902,856	19.8
Totals	132,026	3,536,347	26.8	107,765	2,247,001	20.9	144,826	2,896,824	20.0
Grey	20,278	466 811	23.5	18,759	333,010	17 8	25,968	513,152	19.8
Simcoe	53,695	1,342,375	25.0	47,946	872,617	18 2	53,638	1,131,275	21.1
Totals	73,973	1,839,186	24.9	66,705	1,206,527	18.1	79,606	1,644,427	20.7
Middlesex	64,151	2,019,209	29.2	60,169	1,365,836	22.7	71,276	1,468,788	20 6
Oxford	38,359	1,104,709	28.8	33,927	800,677	23.6	38,397	802,795	20 9
Brant	26,912	745,162	27.7	21,398	468,616	21 9	28,602	554,617	19.4
Perth	36,103	1,072,556	29.7	24,642	637,303	21.5	42,991	881,032	20.5
Wellington	13,816	366,124	26.5	12,102	231,148	19.1	23,801	481,488	20.2
Waterloo	36,721	947,492	25 8	32,550	636,570	21 4	38,784	815,771	21.0
Dufferin	6,580	150,024	22.8	4,894	89,071	18.2	9,617	186,544	19.4
Totals	227,652	6,405,516	28.1	194,682	4,289,221	22.0	253,471	5,191,035	20.5
Lincoln	21,227	496,712	23.4	18,186	318,255	17.5	21,258	394,191	18.5
Wentworth	23,941	632,012	26.4	23,755	496,211	17 1	29,423	558,284	19 0
Halton	18,728	432,617	23 1	16,284	260,544	16 0	21,150	414,946	19 6
Peel	23,331	513,282	22.0	16,129	288,709	17.9	25,175	533,556	21.2
York	32,451	814,520	25.1	24,134	514,054	21.3	35,330	785,546	22.2
Ontario	5,560	142,842	25.7	4,153	88,044	21.2	8,618	192,519	22 3
Durham	4,641	119,156	25 8	4,242	92,940	21.9	3,767	78,119	20.7
Northumberland	13,908	254,764	18.2	12,873	262,699	20 4	11,566	231,810	20.0
Prince Edward	6,588	118,584	18.0	3,345	76,935	23.0	2 666	47,915	18.0
Totals	150,165	3,515,869	23.4	123,101	2,308,261	18.8	158,983	3,236,886	20.4
Lennox and Addington	4,839	83,231	17.2	2,651	50,369	19.0	2,413	42,316	17 5
Frontenac	1,244	22,516	18 1	707	10,888	15.4	1,615	2 ,854	18.5
Leeds and Grenville	3,001	50,417	16 8	2,672	40,614	15 2	4,688	85,334	18.2
Dundas	508	10,719	21.1	285	4,275	15 0	974	17,621	18.1
Stormont	98	2,450	25.0	127	1,524	12.0	560	10,220	18 3
Glengarry	195	3,413	17.5	65	813	12.5	508	8,314	16 4
Prescott	...	...	...	45	540	12.0	61	793	12 4
Russell	42	1,126	26 8	27	592	16 0	192	3,437	17 9
Carleton	69	1,918	27 8	778	14,938	19 2	1,287	19,397	15.1
Renfrew	233	3,914	16 8	418	7,902	19.0	830	14,687	17.7
Lanark	1,966	34,405	17 5	2,177	27,430	12.6	2,977	55,874	18.8
Totals	12,195	214,109	17 6	9,952	159,925	16.1	16,108	287,877	17.9
Victoria	2,691	59,867	22 2	2,825	43,223	15.3	7,425	146,62-	19 7
Peterborough	6,243	109,319	17 6	8,355	132,84	15.9	9,789	189,591	19 4
Haliburton	80	1,851	20 8	271	3,686	13 6	129	2,058	16 0
Hastings	12,757	236,065	18.5	11,825	224,675	19.0	9,466	183,171	19.4
Totals	21,753	407,012	18 7	23,276	404,429	17.4	26,809	521,448	19.5
Muskoka	27	432	16 0	32	480	15.0	61	1,051	17.3
Parry Sound	60	948	15.8	157	1,963	12.5	49	789	16.1
Nipissing	...	...	...	20	276	13.8	2	27	14.0
Algoma	513	12,569	24 5	695	13,483	19 4	447	8,999	20.1
Totals	600	13,949	23.2	904	16,202	17.9	559	10,869	19.4
The Province	849,956	21,872,488	25.7	720,101	14,267,383	19.8	902,846	18,059,235	20.0

AREA AND PRODUCE.—SPRING WHEAT.

TABLE IX. Showing by County Municipalities and groups of Counties the area and produce of Spring Wheat in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush per acre.
Essex	1,916	34,680	18.1	2,907	38,663	13.3	1,695	25,986	15.3
Kent	4,079	76,277	18.7	10,243	146,474	14.3	3,580	57,103	16.0
Elgin	1,015	19,793	19 5	1,436	23,467	16.3	1,626	25,412	15.6
Norfolk	971	16,313	16.8	769	10,535	13.7	838	12,207	14.6
Haldimand	4,822	66,061	13.7	7,299	81,019	11.1	3,432	45,975	13.4
Welland	608	8,634	14.2	894	10,549	11.8	1,349	18,713	13.9
Totals	13,411	221,758	16.5	23,548	310,647	13.2	12,520	185,396	14.8
Lambton	5,959	119,180	20.0	7,098	107,180	15.1	6,274	94,680	15 1
Huron	11,642	259,617	22.3	9,379	152,878	16.3	16,010	226,150	14.1
Bruce	11,812	231,515	19 6	13,768	209,274	15.2	13,293	191,625	14.4
Totals	29,413	610,312	20.7	30,245	469,332	15.5	35,577	512,455	14.4
Grey	24,981	464,647	18 6	33,734	448,662	13.3	38,895	554,063	14 2
Simcoe	29,587	606,534	20.5	36,774	485,417	13.2	34,428	536,156	15.6
Totals	54,568	1,071,181	19.6	70,508	934,079	13.2	73,323	1,090,219	14.9
Middlesex	4,229	87,117	20.6	4,936	85,393	17.3	9,861	152,124	15.4
Oxford	5,845	126,252	21.6	7,168	117,555	16.4	8,860	146,166	16 5
Brant	918	17,442	19 0	1,563	26,415	16.9	1,184	16,969	14.3
Perth	10,504	243,693	23.2	9,900	172,260	17 4	11,980	185,595	15 5
Wellington	23,280	521,472	22.4	20,826	366,538	17.6	20,459	316,027	15.5
Waterloo	2,654	58,919	22 2	2,846	47,528	16.7	4,605	69,933	15.2
Dufferin	21,356	459,154	21.5	24,810	377,112	15.2	20,825	312,253	15.0
Totals	68,786	1,514,049	22 0	72,049	1,192,801	16.6	77,674	1,199,067	15.4
Lincoln	2,345	34,472	14 7	3,017	34,997	11 6	2,201	31,926	14.5
Wentworth	4,351	75,707	17.4	5,135	73,431	14.3	2,886	44,073	15.3
Halton	5,417	96,423	17.8	8,820	121,716	13.8	4,098	63,006	15 4
Peel	17,608	373,290	21.2	22,470	343,791	15.3	13,701	234,471	17.1
York	24,034	526,345	21.9	32,394	427,622	13.0	26,156	450,907	17.2
Ontario	49,256	1,113,186	22.6	51,289	538,535	10 5	47,175	821,761	17 4
Durham	31,623	657,758	20.8	35,779	379,257	10.6	36,057	591,558	16.5
Northumberland	23,166	410,038	17.7	29,210	315,168	10.8	27,153	382,267	14 1
Prince Edward	3,774	69,064	18.3	6,884	88,804	12.9	6,266	87,330	13.9
Totals	161,571	3,356,283	20.8	195,498	2,323,621	11.9	165,693	2,710,299	16.4
Lennox and Addington	2,841	52,274	18 4	6,510	67,053	10.3	5,657	82,552	14.6
Frontenac	8,473	177,086	20.9	9,398	98,679	10.5	8,696	132,720	15.3
Leeds and Grenville	9,242	206,097	22.3	13,181	127,856	9.7	12,769	204,823	16.0
Dundas	3,500	95,550	27.3	4,236	56,339	13.3	4,475	86,800	19.4
Stormont	3,388	80,634	23.8	4,073	56,207	13.8	4,368	79,868	18.3
Glengarry	7,641	164,282	21.5	7,967	91,621	11.5	7,872	131,060	16.6
Prescott	8,336	178,390	21.4	9,060	122,310	13.5	8,230	133,692	16 2
Russell	3,496	91,945	26.3	3,559	48,402	13.6	3,985	69,961	17 6
Carleton	22,510	679,802	30.2	25,165	269,266	10.7	21,871	397,796	18.2
Renfrew	22,187	463,708	20.9	26,482	325,729	12.3	24,228	406,024	16.8
Lanark	14,090	304,344	21.6	16,029	144,261	9.0	14,463	219,791	15 2
Totals	105,704	2,494,112	23.6	125,660	1,407,723	11 2	116,614	1,945,087	16.7
Victoria	30,340	628,038	20.7	35,477	457,653	12.9	31,877	490,245	15.4
Peterborough	30,573	513,626	16.8	28,920	335,472	11.6	26,131	359,949	13 8
Haliburton	1,652	28,084	17 0	1,940	21,310	11.0	1,395	18,625	13 4
Hastings	7,844	138,054	17 6	10,464	122,429	11.7	14,153	216,045	15.3
Totals	70,409	1,307,802	18.6	76,801	936,894	12.2	73,556	1,084,864	14.7
Muskoka	855	15,732	18.4	1,208	16,550	13.7	1,320	19,799	15.0
Parry Sound	910	14,196	15.6	1,143	13,145	11.5	1,336	21,307	15.9
Nipissing	286	5,148	18.0	260	3,718	14.3	55	887	16 1
Algoma	4,718	100,965	21.4	4,833	75,395	15.6	5,879	113,618	19.3
Totals	6,769	136,041	20.1	7,444	108,808	14.6	8,590	155,611	18.1
The Province	510,634	10,711,538	21.0	601,753	7,683,905	12.8	563,547	8,882,998	15.8

AREA AND PRODUCE—BARLEY.

TABLE X. Showing by County Municipalities and groups of Counties the area and produce of Barley in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	4,588	123,417	26 9	7,894	177,616	22.5	3,451	90,153	26.1
Kent	7,689	228,363	29.7	8,739	209,736	24.0	6,830	186,501	27.3
Elgin	5,392	167,691	31.1	8,055	190,901	23 7	4,863	132,627	27.3
Norfolk	4,967	125,665	25.3	6,088	130,283	21.4	6,051	154,037	25.5
Haldimand	8,015	130,645	16.3	12,672	198,950	15.7	13,589	298,556	22.0
Welland	3,129	81,120	26.0	3,597	58,991	16.4	3,730	87,276	23.4
Totals	33,771	856,901	25.4	47,045	966,480	20.5	38,514	949,150	24.6
Lambton	11,378	335,651	29.5	17,339	360,651	20.8	14,539	379,372	26.1
Huron	21,508	617,280	28.7	32,386	819,366	25.3	27,258	749,864	27.5
Bruce	12,747	372,212	29.2	16,622	433,834	26.1	18,472	482,501	26.1
Totals	45,633	1,325,143	29.0	66,347	1,613 851	24.3	60,269	1,611,737	26.7
Grey	12,833	361,891	28.2	15,726	396,295	25.2	21,533	533,049	24.8
Simcoe	27,291	821,459	30.1	30,632	722,915	23.6	30,920	807,774	26.1
Totals	40,124	1,183,350	29.5	46,358	1,119,210	24.1	52,453	1,310,823	25.6
Middlesex	13,728	418,704	30.5	17,752	434 924	24.5	15,225	407,488	26.8
Oxford	14,329	480,022	33.5	16,542	453,251	27 4	16,750	504,350	30.1
Brant	14,501	378,476	26.1	22,016	540,127	24.5	18,577	503,525	27.1
Perth	14,145	472,443	33.4	18,499	514,272	27.8	17 367	516,984	29.8
Wellington	28,976	915,642	31.6	34,022	932,203	27 4	35,098	1,000,626	28 5
Waterloo	17,859	562,559	31 5	20,843	619,037	29 7	17,128	526,375	30.7
Dufferin	11,115	315,666	28.4	12,502	312,550	25.0	11,934	306,762	25.7
Totals	114,653	3,543,512	30.9	142,206	3,806,364	24 8	132,079	3,766,110	28.5
Lincoln	3,098	66,607	21 5	5,315	101,517	19 1	4 318	105,180	24.4
Wentworth	10,925	266,570	24.4	15,466	335,612	21.7	13,068	355,616	27.2
Halton	8,790	225,024	25 6	12,018	288 432	24 0	12,754	354,578	27.8
Peel	27,431	757,096	27.6	36,832	865 552	23 5	34,900	959,131	27.5
York	43,812	1,423,890	32.5	54,041	1,117.798	21.9	55,899	1,626,095	29 1
Ontario	29,303	914,254	31.2	34,162	717,402	21.0	37,976	1,079,448	28.4
Durham	33,802	1,047,862	31 0	37,797	650,108	17 2	45,383	1,214,057	26.8
Northumberland	21 019	617,288	25 7	32,123	573,887	17 7	42,922	965,896	22.5
Prince Edward	22,525	540,600	24.0	31,699	618,131	19.5	38,149	798,889	20.8
Totals	203,705	5,859,191	28.8	256,753	5,268,439	20.5	285,669	7,459,220	26.1
Lennox and Addington	17,958	463,316	25.8	25,854	447,274	17.3	36,781	812.924	22.1
Frontenac	8,208	215,870	26 3	12,529	236,798	18.9	16,981	387,784	22.8
Leeds and Grenville	8,898	261,691	29 4	8,327	151,551	18.2	10,554	264,235	25.0
Dundas	4,865	155,712	32.0	5,336	108,321	20 3	6,434	189,192	29.4
Stormont	2,501	80,282	32.1	3,289	74,003	22 5	2,410	66,752	27.7
Glengarry	2,168	61,571	28.4	2,166	50,306	20.4	2,231	52,183	23.3
Prescott	3,913	116,647	29.8	5,005	110,110	22.0	3,111	83,249	26.8
Russell	2,221	72,405	32.6	2,272	52,439	23.6	1,609	41,278	25.7
Carleton	10,489	418,511	39.9	9,353	231,954	24.8	8,284	249,974	30.2
Renfrew	1,435	35,736	25 6	1,681	31,771	18.9	1,466	35,472	24.2
Lanark	2,834	87,854	31.0	3,554	75,345	21 2	2,916	76,944	26.4
Totals	65,491	1,970,465	30.1	79,616	1,569,872	19 7	92,780	2,259,937	24.4
Victoria	22,833	723,806	31.7	25,692	565,224	22.0	29,877	765,362	25.6
Peterborough	5,672	143,502	25.3	7,924	159,272	20.1	12,525	302,467	24.1
Haliburton	253	6,199	24.5	308	6,252	20.3	278	6,625	23.8
Hastings	18,575	468,090	25.2	26,848	477,804	17.8	36,937	843,837	22.8
Totals	47,333	1,341,597	28.3	60,772	1,208,642	19.9	79.617	1,918,291	24.1
Muskoka	635	15,621	24.6	568	11,360	20.0	545	11,927	21 9
Parry Sound	912	21,067	23.1	755	16,459	21.8	686	15,641	22.8
Nipissing	135	3,308	24 5	194	4,326	22.3	33	763	23.1
Algoma	774	21,749	28 1	712	15,166	21.3	600	15,752	26.3
Totals	2,456	61,745	25.1	2,229	47,311	21.2	1,864	44,083	23 6
The Province	553,166	16,141,904	29.2	701,326	15,600,169	22.2	743,245	19,349,351	26.0

AREA AND PRODUCE—OATS.

TABLE XI. Showing by County Municipalities and groups of Counties the area and produce of Oats in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	33,872	1,293,910	38.2	40,809	1,048,791	25.7	30,886	1,167,948	37.8
Kent	36,835	1,598,639	43.4	35,034	1,005,476	28.7	33,281	1,331,331	40 0
Elgin	32,085	1,366,821	42.6	34,638	886,733	25.6	32,604	1,233,375	37.8
Norfolk	25,557	971,166	38.0	28,135	602,089	21.4	26,737	860,153	32.2
Haldimand	24,026	627,079	26.1	25,548	505,850	19.8	23,131	734,919	31.8
Welland	19,901	712,456	35.8	21,642	380,899	17.6	19,787	618,954	31 3
Totals	172,276	6,570,071	38.1	185,806	4,429,838	23.8	166,426	5,946,680	35.7
Lambton	49,276	2,138,578	43.4	55,419	1,344,149	24.7	41,807	1,524,690	36 5
Huron	86,769	3,607.094	41 6	94,630	2,952,456	31.2	79,467	2,935,036	36.9
Bruce	73,615	2,716,394	36.9	73,700	2,211,060	30.0	62,410	2,044,745	32.8
Totals	209,600	8,462.066	40.4	223,749	6,507,605	29.1	183,684	6,504,471	35.4
Grey	105,102	3,825.713	36.4	101,957	3,028,123	29 7	90,510	2,907,802	32.1
Simcoe	72,886	2,951,883	40.5	75,668	2,292,740	30.3	65,436	2,267,393	34.7
Totals	177,988	6,777,596	38.1	177,625	5,320,863	30.0	155,946	5,175,195	33.2
Middlesex	75,316	3,276,246	43.5	84,083	2,522,490	30.0	73,628	2,821,495	38.3
Oxford	55,812	2,617,583	46.9	58.287	1,731,124	29.7	53,476	2,083.720	39.0
Brant	20,026	805,045	40.2	20,690	587,596	28.4	18,429	673,717	36 6
Perth	66,984	3,208,534	47.9	68,435	2,436,286	35.6	58,040	2,400,992	41.4
Wellington	87,511	3,780,475	43.2	91,045	2,968,067	32.6	73,778	2,756,177	37.4
Waterloo	42,414	1,853,492	43.7	44,317	1,316.215	29.7	36,580	1,388,735	38.0
Dufferin	39,244	1,534,440	39.1	40,040	1,057,056	26.4	30,883	1,063,157	34.4
Totals	387,307	17,075,815	44.1	406,897	12,618,834	31.0	344,814	13,187,993	38.2
Lincoln	18,899	587,759	31.1	20,232	418,802	20.7	17,923	584,096	32.6
Wentworth	27,935	1,047,563	37.5	30,455	785,739	25.8	28.742	1,038,458	36.1
Halton	21,918	846,035	38.6	22,448	626,160	27.9	19,328	699,048	36.2
Peel	35,855	1,620,646	45.2	37,109	1,105,848	29.8	30,398	1,155,060	38.0
York	74,071	3,614,665	48.8	76,512	2,433,082	31.8	64,718	2,687,224	40 7
Ontario	57,609	2,598,166	45.1	54,935	1,659,037	30.2	50,128	1,951,374	38.9
Durham	40,112	1,652,614	41.2	36,511	938,335	25.7	34,417	1,234,944	35.9
Northumberland	32,474	1,208,033	37.2	34,521	869,929	25.2	30,537	927,235	30.4
Prince Edward	14,902	524,550	35.2	14,488	378,137	26.1	13,704	391,476	28.6
Totals	323,775	13,700,031	42.3	327,206	9,215,067	28.2	289,895	10,618,915	36.6
Lennox and Addington	21,996	820,451	37.3	25,212	562.228	22.3	22,368	648,296	29.0
Frontenac	30,278	1,108,175	36 6	29,902	702,697	23 5	27,919	812,083	29.1
Leeds and Grenville	71,190	2,783,529	39.1	72,221	1,661,683	23.0	66,299	2,132,105	32.2
Dundas	30.245	1,336,829	44 2	29,823	754,522	25 3	29,621	1,065,522	36.0
Stormont	23,096	953,865	41.3	22,342	625,576	28.0	24,033	840,195	35.0
Glengarry	31,718	1,230,658	38 8	30,480	697,992	22 9	30,323	979,193	32.3
Prescott	27,581	1,039,804	37.7	31,013	790 832	25.5	26,559	836,619	31.5
Russell	19,972	858,796	43.0	22,417	656,818	29.3	18,643	616,507	33.1
Carleton	64,883	3,120,872	48 1	63,724	1,816,134	28.5	60,696	2,182,097	36.0
Renfrew	46,390	1,758,181	37.9	43,262	1,163,748	26.9	41.359	1,341,717	32.4
Lanark	42,500	1,793,500	42.2	41,012	1,099,122	26 8	37,650	1,204,806	32.0
Totals	409,849	16,804,660	41.0	411,408	10,530,752	25.6	385,470	12,659,140	32.8
Victoria	43,639	1,741,196	39 9	42,032	1,269,366	30.2	39,333	1,334.672	33.9
Peterborough	36,658	1,290,362	35 2	31,797	880,777	27.7	30.605	970,697	31.7
Haliburton	5,180	166,278	32.1	5,777	155,979	27.0	5,132	143,501	28.0
Hastings	45,367	1,537,941	33.9	43,330	1,122,247	25.9	42,294	1,264,214	29.9
Totals	130,844	4,735,777	36.2	122,936	3,428,369	27.9	117,364	3,713,084	31.6
Muskoka	10,285	335,291	32 6	10,558	280,843	26.6	9,038	265.117	29.3
arry Sound	9,419	276,919	29.4	7,569	196,037	25.9	5,378	161,691	30.1
Nipissing	2,078	68,574	33.0	1,668	49.039	29 4	375	11,761	31.4
Algoma	7,215	202,742	28.1	6,944	190,960	27.5	4,815	166,556	34.6
Totals	28,997	883,526	30.5	26,739	716,879	26.8	19,606	605,125	30.9
The Province	1,840,636	75,009,542	40.8	1,882,366	52,768,207	28.0	1,663,205	58,410,603	35.1

AREA AND PRODUCE—RYE.

TABLE XII. Showing by County Municipalities and groups of Counties the area and produce of Rye in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	503	10,513	20.9	873	14,841	17 0	774	15,726	20 3
Kent	760	16,796	22.1	1,484	32,203	21.7	740	15.951	21.6
Elgin	610	11,773	19.3	1,116	18,972	17.0	1,243	22,485	18.1
Norfolk	4,999	81,484	16 3	9,714	124,339	12 8	7,457	103,717	13.9
Haldimand	353	4,695	13 3	56	7,896	14 0	763	12,248	16.1
Welland	388	7,256	18 7	243	3,645	15.0	594	10,265	17.3
Totals	7,612	132,517	17.4	13,994	201,896	14.4	11,571	180,395	15.6
Lambton	124	1,984	16 0	462	8,778	19.0	237	4,017	16.9
Huron	348	6,960	20 0	306	4,590	15.0	278	4,881	17.6
Bruce	588	10,996	18.7	964	19,280	20 0	472	8,663	18.4
Totals	1,060	19,940	18.8	1,732	32,618	18.8	987	17,561	17.8
Grey	515	9,270	18.0	1,031	14,125	13 7	568	9,887	17.4
Simcoe	1,831	34,240	18.7	3,038	47,697	15.7	2,319	41,806	18.0
Totals	2,346	43,510	18.5	4,069	61,822	15.2	2,887	51,693	17.9
Middlesex	396	8,158	20 6	892	15,342	17.2	507	8,875	17.5
Oxford	512	10,240	20.0	1,502	24,032	16 0	1,165	18,369	15 8
Brant	445	7,877	17 7	1,621	27,345	16 9	1,031	15,572	15 1
Perth	7	117	16 7	79	1,185	15 0	172	2,538	14.8
Wellington	639	11.310	17.7	622	10,574	17.0	804	14,313	17.8
Waterloo	322	6,826	21.2	576	10,080	17 5	513	8,980	17.5
Dufferin	315	6,300	20 0	357	5,177	14.5	671	11,984	17.9
Tota's	2,636	50,828	19.3	5,619	93,785	16.6	4,863	80,631	16.6
Lincoln	78	1,451	18 6	606	7,757	12 8	398	6,122	15.4
Wentworth	692	12,733	18 4	965	14,475	15 0	951	16,215	17.1
Halton	564	11,562	20.5	877	11,664	13.3	532	8,968	16 9
Peel	469	7.316	15 6	585	9,786	16.7	1,197	23,290	19 5
York	758	14,857	19.6	1,089	20,691	19 0	1,589	26,582	16 8
Ontario	1,135	18,614	16 4	1,548	22,291	14 4	2,446	43,568	17.5
Durham	2,695	44,198	16.4	3,908	55,103	14.1	4,635	70,843	15.3
Northumberland	9,485	119,511	12 6	12,345	155,799	12.6	11,232	150,019	13.4
Prince Edward	5,378	85,510	15.9	6,329	88,606	14.0	8,555	120,702	14.1
Totals	21,254	315,752	14.9	28,273	386,172	13.7	31,576	466,309	14.8
Lennox and Addington	2,808	40,716	14 5	3,450	49,680	14.4	4,727	69,934	14.8
Frontenac	3,517	54,865	15 6	3,391	48,491	14.3	3,673	59,914	16.3
Leeds and Grenville	2,122	42,652	20.1	4,153	57,727	13.9	5,611	97,995	17.5
Dundas	584	13 841	23 7	486	10,400	21.4	1,248	28,234	22.6
Stormont	286	5,720	20.0	332	5,810	17 5	438	8,986	20.5
Glengarry				201	3,015	15 0	61	1,022	16.8
Prescott				54	783	14.5	227	4,192	18 5
Russell	453	11,325	25 0	471	9,891	21 0	256	5,323	20.8
Carleton	1,443	32,179	22.3	4,578	82,500	18 1	5,506	109,246	18.2
Renfrew	7,365	134,043	18.2	9,126	156,055	17.1	6,833	132,007	19.3
Lanark	2,710	51,490	19 0	3,354	50,981	15.2	4,350	81,089	18.6
Totals	21,288	386,831	18.2	29,576	475,333	16.1	32,930	589.022	17.9
Victoria	849	15,791	18 6	1,819	31,651	17.4	1,194	20,659	17.3
Peterborough	3,301	48,525	14.7	6,116	86,236	14 1	3,445	52,835	15.3
Haliburton	207	3,705	17.9	410	6,683	16.3	260	4,388	16.9
Hastings	6,508	101,525	15.6	10,513	170,311	16.2	13,000	201,893	15.5
Totals	10,865	169,546	15.6	18,858	294,881	15.6	17,899	279,775	15.6
Muskoka	122	2,367	19.4	367	6,166	16.8	360	6,795	18.9
Parry Sound	293	5,860	20.0	154	3,711	24.1	319	6,675	20.9
Nipissing	179	3,383	18.9	82	1,558	19.0	26	494	19 0
Algoma	209	4 096	19.6	307	5,373	17.5	218	3,861	17.7
Totals	803	15,706	19.6	910	16,808	18.5	923	17,825	19.3
The Province	67,865	1,134,630	16 7	103,061	1,563,345	15.2	103.636	1,683,211	16 2

AREA AND PRODUCE—PEAS.

TABLE XIII. Showing by County Municipalities and groups of Counties the area and produce of Peas in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acres.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	1,954	36,149	18.5	4,179	73,968	17.7	3,680	68,503	18.6
Kent	6,173	117,904	19.1	12,771	192,842	15.1	10,290	196,197	19 1
Elgin	14,822	366,103	24.7	19,030	249,293	13.1	13,194	246,099	18.7
Norfolk	20,485	450,670	22.0	23,842	381,472	16.0	16,273	316,183	19.4
Haldimand	17,451	251.294	14.4	18,316	289,398	15.8	14,134	252,158	17.8
Welland	5,049	87,853	17.4	6,058	75,725	12.5	4,338	73,372	16.9
Totals	65,934	1,309,973	19.9	84,196	1,262,693	15.0	61,909	1,152,512	18.6
Lambton	9,964	214,226	21.5	15,844	240,829	15.2	10,071	189,089	18.8
Huron	41,424	1,126,733	27.2	45,558	9:0,272	20.2	33,881	768,310	22.7
Bruce	46,946	1,258,153	26.8	43,548	1,062,571	24.4	38,571	889,508	23.1
Totals	98,334	2,599,112	26.4	104,950	2,223,672	21.2	82,523	1,846,907	22.4
Grey	52,303	1,302,843	24.9	48,563	1,058,673	21.8	46,611	1,016,435	21.8
Simcoe	38,840	994,304	25.6	37,511	810,238	21.6	32,724	714,801	21.8
Totals	91,163	2,297,147	25.2	86,074	1,868,911	21.7	79,335	1,731,236	21.8
Middlesex	24,689	632,038	25.6	29,829	486,213	16.3	22,934	452 041	19.7
Oxford	19,555	510,386	26.1	20,656	324.299	15.7	16,220	346,922	21.4
Brant	12,664	300,137	23.7	12,329	245.347	19.9	9,529	195,820	20.5
Perth	25,862	739,653	28.6	29,557	575,397	19.6	23,770	543,551	22.9
Wellington	37,645	937,361	24.9	43,377	915.255	21 1	37,763	856,480	22.7
Waterloo	18,697	501.079	26.8	19,999	415,979	20.8	15,176	344,133	22.7
Dufferin	16,037	356,021	22.2	15,354	322,434	21.0	12,369	260,627	21.1
Totals	155,149	3,976,675	25.6	170,901	3,284.924	19.2	137,761	2,998,574	21.8
Lincoln	6,406	94,809	14.8	7,701	1:0,196	15.6	5,112	89,530	17.5
Wentworth	12,642	266,746	21.1	14,046	276.706	19 7	11,104	225.097	20.3
Halton	11,359	253,994	22.4	13,729	270,461	19.7	10,704	227,980	21.3
Peel	16,976	370,077	21.8	20,465	425,672	20.8	14,528	300,462	20.7
York	32,026	797,696	24.9	36,074	771.984	21.4	29,009	650,449	22.4
Ontario	30,927	807,195	26.1	27,973	475,541	17.0	27,074	569,468	21.0
Durham	25,943	614,849	23 7	22,130	371,784	16.8	21,941	430,340	19.6
Northumberland	22,721	502,134	22.1	20,191	411,896	20.4	20,413	359,987	17.6
Prince Edward	20,449	474,417	23.2	18,907	414,063	21.9	14,179	262,531	18.5
Totals	179,439	4,181,917	23.3	181,216	3,538,243	19.5	154,094	3,115,844	20.2
Lennox and Addington	10,923	242,491	22 2	9,861	182,429	18.5	9,035	168,863	18.7
Frontenac	10,615	249,688	23.5	10,294	181,174	17.6	10,852	196,635	18.1
Leeds and Grenville	6,215	157,861	25.4	5,493	95.029	17.3	6,270	121,345	19.4
Dundas	1,558	41,985	27.0	1,262	31,298	24.8	1,660	36,581	21.9
Stormont	2,251	60,327	26.8	1,637	35,359	21 6	2,489	51,428	20 7
Glengarry	4,416	98,035	22.2	3,981	72,454	18.2	5,556	100,981	18.2
Prescott	6,063	166,126	27.4	6,396	111,930	17.5	8,350	141,205	16.9
Russell	2,726	66,242	24.3	4,039	76,741	19.0	3,637	71,526	19.7
Carleton	12,367	353,696	28.6	10,011	228,251	22.8	12,718	279.953	22.0
Renfrew	21,701	496,953	22.9	21,276	472,327	22.2	20,739	431,627	20.8
Lanark	11,785	320,552	27 2	11,346	230,324	20.3	11,411	247,896	21.7
Totals	90,627	2,253,956	24.9	85,596	1,717,316	20.1	92,717	1,847,840	19.9
Victoria	17,662	436,251	24 7	17,117	379,997	22.2	16,174	338,865	20.9
Peterborough	15,913	377,138	23.7	16,143	356,760	22.1	15,175	296,592	19 5
Haliburton	2,297	44,792	19.5	2.097	39,843	19.0	1,665	31,454	19.0
Hastings	20,788	476,045	22.9	20,707	447,271	21.6	18,738	343,231	18.3
Totals	56,660	1,334,226	23.5	56,064	1,223,871	21.8	51,752	1,009,842	19.5
Muskoka	4,187	104,675	25.0	3,756	83,008	22.1	2,941	62,690	21.3
Parry Sound	3,365	75,040	22.3	2,512	49.389	19.9	1,644	34,870	21.2
Nipissing	725	16,240	22.4	696	14,477	20.8	142	3,072	21.6
Algoma	6,870	174,498	25.4	5,245	122,209	23.3	4,144	105,271	25.4
Totals	15,147	370,453	24.5	12,209	269,683	22.1	8,871	205,903	23.2
The Province	752,453	18,323,459	24.4	781,206	15,389,313	19.7	668,962	13,908,658	20.8

AREA AND PRODUCE—CORN.

TABLE XIV. Showing by County Municipalities and groups of Counties the area and produce of Corn in Ontario in the years 1890 and 1891, with the yearly average for the nine years 1882-91 (1883 not included); also the yield per acre.

Counties.	1891.			1890.			Yearly average for the nine years 1882-91.		
	Acres.	Bushels in the ear.	Bush. per acre.	Acres.	Bushels in the ear.	Bush. per acre.	Acres.	Bushels in the ear.	Bush. per acre.
Essex	36,949	2,671,413	72.3	38,436	2,863,482	74.5	32,205	2,346,685	72.9
Kent	30,300	2,342,190	77.3	27,596	2,011,748	72.9	26,413	1,878,163	71.1
Elgin	14,625	1,216,800	83.2	13,313	812,093	61.0	14,336	1,041,263	72.6
Norfolk	12,272	895,856	73.0	13,027	648,745	49.8	13,723	873,773	63.7
Haldimand	1,155	88,242	76.4	1,916	91,585	47.8	1,861	121,460	65.3
Welland	5,736	477,235	83.2	5,626	268,360	47.7	6,109	385,922	63.2
Totals	101,037	7,691,736	76.1	99,914	6,696,013	67.0	94,647	6,647,266	70.2
Lambton	10,588	889,392	84.0	9,220	566,108	61.4	7,769	494,776	63.7
Huron	2,870	180,236	62.8	2,538	148,727	58.6	1,817	121,562	66.9
Bruce	1,860	103,788	55.8	1,832	78,776	43.0	855	45,128	52.8
Totals	15,318	1,173,416	76.6	13,590	793,611	58.4	10,441	661,466	63.4
Grey	1,567	62,680	40.0	2,004	100,200	50.0	776	36,069	46.5
Simcoe	1,558	109,060	70.0	1,342	81,862	61.0	939	55,591	59.2
Totals	3,125	171,740	55.0	3,346	182,062	54.4	1,715	91,660	53.4
Middlesex	12,732	1,115,323	87.6	12,935	811,025	62.7	11,172	770,541	69.0
Oxford	10,332	823,460	79.7	10,775	633,570	58.8	8,935	569,573	63.7
Brant	4,685	389,792	83.2	4,938	357,017	72.3	4,773	336,140	70.4
Perth	2,229	160,488	72.0	1,671	91,905	55.0	998	64,044	64.2
Wellington	1,348	83,576	62.0	1,551	93,060	60.0	768	45,678	59.5
Waterloo	1,795	133,728	74.5	1,494	94,570	63.3	1,340	88,649	66.2
Dufferin	256	12,800	50.0	226	11,300	50.0	110	5,661	51.5
Totals	33,377	2,719,167	81.5	33,590	2,092,447	62.3	28,096	1,880,286	66.9
Lincoln	6,262	512,232	81.8	5,970	257,307	43.1	6,249	401,196	64.2
Wentworth	5,337	438,701	82.2	5,214	333,696	64.0	4,596	335,860	73.1
Halton	2,015	173,290	86.0	1,803	129,275	71.7	1,327	87,372	65.8
Peel	1,184	88,800	75.0	1,121	67,260	60.0	665	42,811	64.4
York	2,957	206,990	70.0	2,727	163,620	60.0	1,714	112,106	65.4
Ontario	2,827	183,755	65.0	3,198	170,453	53.3	2,673	156,540	58.6
Durham	2,557	182,314	71.3	2,191	113,275	51.7	1,974	108,034	54.7
Northumberland	6,090	403,158	66.2	5,128	265,118	51.7	4,298	236,333	55.0
Prince Edward	7,022	439,577	62.6	7,340	448,474	61.1	6,113	313,787	51.3
Totals	36,251	2,628,817	72.5	34,692	1,948,478	56.2	29,609	1,794,039	60.6
Lennox and Addington	3,658	278,008	76.0	2,706	150,183	55.5	2,476	142,144	57.4
Frontenac	3,153	217,557	69.0	2,459	135,245	55.0	1,955	107,676	55.1
Leeds and Grenville	12,006	1,046,923	87.2	9,442	626,949	66.4	6,574	450,064	68.5
Dundas	4,478	379,287	84.7	2,233	131,524	58.9	2,035	138,794	68.2
Stormont	2,871	216,761	75.5	1,689	126,675	75.0	1,465	91,129	62.2
Glengarry	2,402	174,145	72.5	2,047	151,069	73.8	1,053	62,006	58.9
Prescott	2,486	222,248	89.4	1,268	95,354	75.2	1,442	89,567	62.1
Russell	1,398	108,345	77.5	752	43,842	58.3	558	31,025	55.6
Carleton	4,053	290,600	71.7	3,350	169,175	50.5	1,871	102,219	54.6
Renfrew	1,298	76,452	58.9	790	35,550	45.0	580	30,456	52.5
Lanark	2,767	143,054	51.7	2,028	126,750	62.5	1,561	78,262	50.1
Totals	40,570	3,153,380	77.7	28,764	1,792,316	62.3	21,570	1,323,342	61.4
Victoria	1,056	52,800	50.0	726	43,560	60.0	636	39,444	62.0
Peterborough	761	40,333	53.0	758	39,795	52.5	447	22,026	49.3
Haliburton	118	6,089	51.6	147	5,880	40.0	113	5,525	48.9
Hastings	8,943	626,010	70.0	7,918	402,234	50.8	6,216	330,797	53.2
Totals	10,878	725,232	66.7	9,549	491,469	51.5	7,412	397,792	53.7
Muskoka	266	10,640	40.0	234	8,564	36.6	214	8,248	38.5
Parry Sound	100	4,500	45.0	56	2,240	40.0	43	1,884	43.8
Nipissing	73	3,570	48.9	35	1,341	38.3	12	546	45.5
Algoma	91	6,461	71.0	66	2,640	40.0	79	3,785	47.9
Totals	530	25,171	47.5	391	14,785	37.8	348	14,463	41.6
The Province	241,086	18,288,659	75.9	223,836	14,011,181	62.6	193,838	12,810,314	66.1

AREA AND PRODUCE—BUCKWHEAT.

TABLE XV. Showing by County Municipalities and groups of Counties the area and produce of Buckwheat in Ontario in the years 1890 and 1891, with the yearly average for the nine years 1882-91; (1883 not included); also the yield per acre.

Counties.	1891.			1890.			Yearly average for the nine years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush per acre.	Acres.	Bushels.	Bush. per acre.
Essex	2,287	54,659	23.9	934	17,092	18.3	822	19,205	23.4
Kent	1,301	35,517	27.3	1,361	29,534	21.7	932	20,953	22.5
Elgin	2,094	51,303	24.5	2,051	43,891	21.4	1,414	30,429	21.5
Norfolk	4,500	109,350	24.3	5,402	113,442	21.0	4,677	94.901	20.3
Haldimand	667	13,007	19.5	427	9,736	22.8	711	13,540	19.0
Welland	3,161	89,772	28.4	1,854	39,676	21.4	1,895	39,862	21.0
Totals	14,010	353,608	25.2	12,029	253,371	21.1	10,451	218,890	20.9
Lambton	820	20,828	25.4	1,103	17,097	15.5	521	10,859	20.8
Huron	378	10,584	28.0	456	9,120	20.0	277	5,615	20.3
Bruce	639	15,528	24.3	860	12,040	14.0	411	7,458	18.1
Totals	1,837	46,940	25.6	2,419	38,257	15.8	1,209	23,932	19.8
Grey	687	13,259	19.3	603	11,276	18.7	390	7,066	18.1
Simcoe	860	16,082	18.7	919	16,818	18.3	445	7,715	17.3
Totals	1,547	29,341	19.0	1,522	28,094	18.5	835	14,781	17.7
Middlesex	406	10,272	25.3	376	7,595	20.2	516	9,639	18.7
Oxford	862	19,740	22.9	933	15,861	17.0	663	12,958	19.5
Brant	522	11,797	22.6	790	15,326	19.4	653	13,232	20.3
Perth	117	2,925	25.0	86	2,150	25.0	109	2,327	21.3
Wellington	410	7,913	19.3	582	14,550	25.0	210	4,756	22.6
Waterloo	185	3,811	20.6	144	2,880	20.0	104	2,106	20.3
Dufferin	279	6,975	25.0	79	1,580	20.0	118	2,466	20.9
Totals	2,781	63,433	22.8	2,990	59,942	20.0	2,373	47,484	20.0
Lincoln	919	23,802	25.9	846	19,458	23.0	698	16,814	24.1
Wentworth	625	17,438	27.9	1,331	26,487	19.9	742	16,492	22.2
Halton	110	2,464	22.4	65	1,300	20.0	158	2,590	16.4
Peel	347	8,675	25.0	148	3,700	25.0	259	4,961	19.2
York	568	13,518	23.8	182	2,548	14.0	288	6,217	21.6
Ontario	2,952	72,619	24.6	1,238	26,369	21.3	777	18,582	23.9
Durham	7,235	169,299	23.4	3,995	86,692	21.7	2,185	48,694	22.3
Northumberland	11,936	284,077	23.8	11,038	231,798	21.0	6,734	145,290	21.6
Prince Edward	10,103	229,338	22.7	8,437	207,550	24.6	7,175	163,926	22.8
Totals	34,795	821,230	23.6	27,280	605,902	22.2	19,016	423,566	22.3
Lennox and Addington.	6,324	151,144	23.9	5,672	145,770	25.7	3,325	82,841	24.9
Frontenac	2,833	71,392	25.2	2,099	55,414	26.4	1,709	41,882	24.5
Leeds and Grenville	6,369	157,951	24.8	7,078	174,827	24.7	5,571	129,787	23.3
Dundas	2,860	74,646	26.1	2,420	74,294	30.7	1,727	47,341	27.4
Stormont	2,774	77,395	27.9	2,346	66,392	28.3	2,097	56,348	26.9
Glengarry	1,441	36,169	25.1	1,580	35,392	22.4	1,111	26,753	24.1
Prescott	1,884	42,955	22.8	1,762	33,830	19.2	1,571	34,075	21.7
Russell	1,500	43,350	28.9	1,373	35,149	25.6	1,026	25,585	24.9
Carleton	4,063	109,295	26.9	2,850	63,840	22.4	3,725	84,311	22.6
Renfrew	1,894	46,971	24.8	1,391	32,132	23.1	1,190	27,469	23.1
Lanark	4,791	125,524	26.2	4,917	108,666	22.1	5,323	125,129	23.5
Totals	36,733	936,792	25.5	33,488	825,706	24.7	28,375	681,521	24.0
Victoria	4,306	78,800	18.3	1,897	43,062	22.7	1,014	19,305	19.0
Peterborough	3,352	59,666	17.8	1,947	50,817	26.1	1,108	23,097	20.8
Haliburton	622	16,048	25.8	340	8,772	25.8	284	5,432	19.1
Hastings	6,582	169,816	25.8	5,218	116,361	22.3	4,133	98,166	23.8
Totals	14,862	324,330	21.8	9,402	219,012	23.3	6,539	146,000	22.3
Muskoka	616	16,694	27.1	548	12,549	22.9	351	9,202	26.2
Parry Sound	206	4,099	19.9	198	5,702	28.8	112	2,695	24.1
Nipissing	162	3,953	24.4	85	2,185	25.7	28	682	24.4
Algoma	330	7,722	23.4	150	3,000	20.0	100	2,247	22.5
Totals	1,314	32,468	24.7	981	23,436	23.9	591	14,826	25.1
The Province	107,879	2,608,142	24.2	90,111	2,053,720	22.8	69,389	1,571,000	22.6

AREA AND PRODUCE—BEANS.

TABLE XVI. Showing by County Municipalities and groups of Counties the area and produce of Beans in Ontario in the years 1890 and 1891, with the yearly average for the nine years 1882-91 (1883 not included); also the yield per acre.

Counties.	1891.			1890.			Yearly average for the nine years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	1,447	28,217	19.5	887	18,893	21.3	605	13,515	22.3
Kent	26,200	455,880	17.4	24,981	492,126	19.7	14,801	279,795	18.9
Elgin	3,347	67,944	20.3	2,599	49,901	19.2	1,459	30,699	21.0
Norfolk	132	2,785	21.1	378	6,124	16.2	495	9,414	19.0
Haldimand	151	3,050	20.2	323	4,942	15.3	170	3,204	18.8
Welland	1,429	24,293	17.0	1,155	13,860	12.0	790	12,244	15.5
Totals	32,706	582,169	17.8	30,323	585,846	19.3	18,320	348,871	19.0
Lambton	757	14,080	18.6	468	5,803	12.4	400	7,510	18.8
Huron	133	3,325	25.0	111	2,775	25.0	118	3,078	26.1
Bruce	134	3,685	27.5	150	2,700	18.0	109	2,229	20.4
Totals	1,024	21,090	20.6	729	11,278	15.5	627	12,817	20.4
Grey	167	3,758	22.5	351	7,020	20.0	138	2,543	18.4
Simcoe	140	3,024	21.6	78	1,404	18.0	109	2,145	19.7
Totals	307	6,782	22.1	429	8,424	19.6	247	4,688	19.0
Middlesex	343	7,066	20.6	322	6,118	19.0	315	6,093	19.3
Oxford	148	2,590	17.5	188	3,102	16.5	209	5,368	25.7
Brant	82	1,476	18.0	269	5,003	18.6	359	6,524	18.2
Perth	20	450	22.5	10	250	25.0	51	1,232	24.2
Wellington	17	340	20.0	39	780	20.0	36	690	19.2
Waterloo	8	160	20.0	61	1,220	20.0	34	700	20.6
Dufferin	99	2,079	21.0	28	560	20.0	28	596	21.3
Totals	717	14,161	19.7	917	17,033	18.6	1,032	21,203	20.5
Lincoln	192	3,763	19.6	262	5,240	20.0	169	3,502	20.7
Wentworth	197	4,098	20.8	541	8,927	16.5	175	3,470	19.8
Halton	7	175	25.0	17	298	17.5	36	690	19.2
Peel	24	480	20.0	24	420	17.5	50	1,235	24.7
York	134	3,189	23.8	79	1,975	25.0	130	3,357	25.8
Ontario	240	4,104	17.1	244	4,221	17.3	239	5,157	21.6
Durham	358	8,807	24.6	392	7,174	18.3	321	6,443	20.1
Northumberland	439	9,043	20.6	594	9,623	16.2	505	10,617	21.0
Prince Edward	247	4,026	16.3	377	6,861	18.2	432	8,891	20.6
Totals	1,838	37,685	20.5	2,530	44,739	17.7	2,057	43,362	21.1
Lennox and Addington	317	7,735	24.4	239	5,091	21.3	181	3,753	20.7
Frontenac	296	5,624	19.0	136	2,530	18.6	289	7,239	25.0
Leeds and Grenville	517	11,839	22.9	565	11,583	20.5	399	8,726	21.9
Dundas	290	7,192	24.8	228	5,700	25.0	258	6,297	24.4
Stormont	242	7,260	30.0	194	4,171	21.5	187	4,767	25.5
Glengarry	199	3,483	17.5	232	4,640	20.0	114	2,709	23.8
Prescott	786	18,392	23.4	365	6,388	17.5	515	13,465	26.1
Russell	196	4,096	20.9	197	3,546	18.0	199	4,348	21.8
Carleton	373	8,915	23.9	600	13,800	23.0	452	10,171	22.5
Renfrew	661	13,617	20.6	626	12,395	19.8	491	11,342	23.1
Lanark	269	6,084	22.7	278	5,365	19.3	226	5,370	23.8
Totals	4,145	94,237	22.7	3,660	75,209	20.5	3,311	78,187	23.6
Victoria	115	2,668	23.2	122	2,843	23.3	88	1,803	20.5
Peterborough	114	2,348	20.6	282	5,640	20.0	139	2,339	16.8
Haliburton	39	936	24.0	26	520	20.0	27	542	20.1
Hastings	291	4,365	15.0	327	7,488	22.9	303	6,016	19.9
Totals	559	10,317	18.5	757	16,491	21.8	557	10,700	19.2
Muskoka	41	820	20.0	37	833	22.5	42	869	20.7
Parry Sound	34	680	20.0	41	820	20.0	18	377	20.9
Nipissing	74	1,569	21.2	11	228	20.7	9	200	22.2
Algoma	6	90	15.0	22	440	20.0	14	273	19.5
Totals	155	3,159	20.4	111	2,321	20.9	83	1,719	20.7
The Province	41,451	769,600	18.6	39,456	761,341	19.3	26,234	521,547	19.9

AREA AND PRODUCE—HAY AND CLOVER.

TABLE XVII. Showing by County Municipalities and groups of Counties the area and produce of Hay and Clover in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Tons.	Tons per acre.	Acres.	Tons.	Tons per acre.	Acres.	Tons.	Tons per acre.
Essex	42,934	53,668	1.25	39,980	69,565	1.74	37,023	57,747	1.56
Kent	56,594	62,253	1.10	53,422	105,776	1.98	51,900	78,788	1.52
Elgin	55,026	57,777	1.05	54,527	104,147	1.91	50,319	75,166	1.49
Norfolk	45,395	47,211	1.04	42,532	72,730	1.71	40,915	55,007	1.34
Haldimand	49,891	31,930	.64	48,325	81,669	1.69	49,295	62,379	1.27
Welland	48,393	45,490	.94	47,790	91,757	1.92	47,006	63,467	1.35
Totals	298,233	298,329	1.00	286,576	525,644	1.83	276,452	392,554	1.42
Lambton	65,622	78,090	1.19	59,278	105,515	1.78	54,793	79,787	1.46
Huron	111,653	100,487	.90	110,221	209,420	1.90	96,856	134,963	1.39
Bruce	100,347	67,233	.67	101,149	169,930	1.68	85,987	107,066	1.25
Totals	277,622	245,810	.89	270,648	484,865	1.79	237,636	321,816	1.35
Grey	129,539	117,880	.91	126,129	239,645	1.90	116,863	144,837	1.24
Simcoe	90,029	90,929	1.01	83,666	135,957	1.63	77,442	102,368	1.32
Totals	219,568	208,809	.95	209,795	375,602	1.79	194,305	247,205	1.27
Middlesex	96,480	117,706	1.22	93,878	189,634	2.02	89,899	137,519	1.53
Oxford	65,797	88,826	1.35	66,180	144,272	2.18	62,457	97,078	1.55
Brant	31,124	37,038	1.19	32,782	75,071	2.29	31,629	46,830	1.48
Perth	68,770	74,959	1.09	72,403	159,287	2.20	67,252	102,992	1.53
Wellington	93,080	99,596	1.07	90,500	181,000	2.00	83,772	125,708	1.50
Waterloo	43,046	36,159	.84	43,690	85,632	1.96	42,399	64,183	1.51
Dufferin	37,570	43,957	1.17	34,205	62,595	1.83	33,622	45,197	1.34
Totals	435,867	498,241	1.14	433,638	897,491	2.07	411,030	619,507	1.51
Lincoln	38,860	36,917	.95	38,797	77,594	2.00	40,595	54,352	1.34
Wentworth	46,666	42,933	.92	41,830	94,954	2.27	44,702	64,771	1.45
Halton	33,366	26,693	.80	30,525	53,419	1.75	33,267	44,553	1.34
Peel	43,236	43,236	1.00	35,884	66,385	1.85	37,941	53,863	1.42
York	88,559	93,873	1.06	71,658	126,835	1.77	73,076	100,738	1.38
Ontario	55,249	60,774	1.10	59,897	106,617	1.78	53,011	75,339	1.42
Durham	46,272	46,272	1.00	46,882	89,545	1.91	43,645	61,301	1.40
Northumberland	59,656	43,549	.73	58,566	92,534	1.58	53,856	67,029	1.24
Prince Edward	33,068	35,383	1.07	33,602	53,091	1.58	29,978	40,080	1.34
Totals	444,932	429,630	.97	417,641	760,974	1.82	410,071	562,026	1.37
Lennox and Addington	59,865	62,260	1.04	63,769	95,654	1.50	49,552	60,145	1.21
Frontenac	72,280	67,943	.94	65,478	110,003	1.68	62,865	75,468	1.20
Leeds and Grenville	118,329	81,647	.69	119,216	180,016	1.51	111,276	141,641	1.27
Dundas	38,894	36,949	.95	40,071	60,107	1.50	35,406	52,909	1.49
Stormont	34,042	34,042	1.00	37,332	51,518	1.38	32,539	48,539	1.49
Glengarry	39,546	25,705	.65	40,757	54,343	1.33	36,590	55,585	1.52
Prescott	43,590	51,436	1.18	43,525	63,982	1.47	33,567	47,285	1.41
Russell	20,061	21,866	1.09	26,835	28,127	1.35	18,101	23,669	1.31
Carleton	69,047	67,666	.98	65,046	83,909	1.29	59,547	77,259	1.30
Renfrew	69,642	48,053	.69	63,443	84,591	1.33	62,646	66,160	1.06
Lanark	61,597	49,278	.80	58,962	83,726	1.42	59,380	78,476	1.32
Totals	626,893	546,845	.87	618,434	895,976	1.45	561,469	727,136	1.30
Victoria	46,430	36,215	.78	42,687	61,042	1.43	38,614	44,523	1.15
Peterborough	46,514	30,234	.65	40,151	65,446	1.63	38,698	43,159	1.12
Haliburton	11,432	6,173	.54	10,196	11,895	1.17	10,079	10,080	1.00
Hastings	79,954	51,970	.65	75,547	129,185	1.71	68,821	84,157	1.22
Totals	184,330	124,592	.68	168,581	267,568	1.59	156,212	181,919	1.16
Muskoka	21,414	11,778	.55	22,417	41,471	1.85	20,709	24,394	1.18
Parry Sound	19,145	15,750	.81	14,580	21,870	1.50	10,670	11,640	1.09
Nipissing	4,446	3,023	.68	4,703	8,223	1.75	915	1,125	1.23
Algoma	17,225	9,991	.58	14,989	26,231	1.75	11,026	13,411	1.22
Totals	62,530	40,542	.65	56,689	97,795	1.73	43,320	50,570	1.17
The Province	2,549,975	2,392,798	.94	2,462,002	4,305,915	1.75	2,290,495	3,102,733	1.35

AREA AND PRODUCE—POTATOES.

TABLE XVIII. Showing by County Municipalities and groups of Counties the area and produce of Potatoes in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	2,685	257,492	95.9	2,600	206,440	79.4	2,761	281,394	101.9
Kent	3,471	447,065	128.8	3,013	290,755	96.5	3,319	415,974	125.3
Elgin	2,609	371,261	142.3	2,646	222,793	84.2	2,792	290,301	104.0
Norfolk	2,733	337,252	123.4	2,807	200,701	71.5	3,305	339,829	102.8
Haldimand	1,046	104,809	100.2	1,320	92,928	70.4	1,436	155,135	108.0
Welland	1,974	208,652	105.7	2,254	143,129	63.5	2,327	220,157	94.7
Totals	14,518	1,726,531	118.9	14,640	1,156,746	79.0	15,940	1,702,790	106.8
Lambton	3,320	417,988	125.9	3,130	254,156	81.2	3,009	312,512	103.9
Huron	5,143	836,766	162.7	4,943	538,274	118.0	5,070	629,800	124.2
Bruce	4,938	857,237	173.6	4,633	529,089	114.2	4,765	575,508	120.8
Totals	13,401	2,111,991	157.6	12,706	1,321,519	104.0	12,844	1,517,820	118.2
Grey	6,853	1,087,571	158.7	6,815	1,089,037	159.8	6,879	898,770	130.7
Simcoe	8,017	1,224,196	152.7	7,396	982,928	132.9	6,927	905,143	130.7
Totals	14,870	2,311,767	155.5	14,211	2,071,965	145.8	13,806	1,803,913	130.7
Middlesex	5,545	865,575	156.1	6,078	577,410	95.0	5,600	614,760	109.8
Oxford	3,287	541,369	164.7	3,149	284,355	90.3	3,275	373,502	114.0
Brant	2,306	353,279	153.2	2,173	236,857	109.0	2,224	255,361	114.8
Perth	3,546	575,161	162.2	3,403	439,668	129.2	3,703	436,921	118.0
Wellington	5,808	908,371	156.4	6,203	825,619	133.1	5,894	740,708	125.7
Waterloo	2,699	411,598	152.5	2,896	351,285	121.3	2,879	356,069	123.7
Dufferin	3,720	595,944	160.2	3,919	540,038	137.8	3,187	455,035	142.8
Totals	26,911	4,251,297	158.0	27,821	3,255,232	117.0	26,762	3,232,356	120.8
Lincoln	1,732	222,042	128.2	1,747	140,109	80.2	1,887	188,578	99.9
Wentworth	4,332	615,577	142.1	4,219	391,945	92.9	3,647	436,627	119.7
Halton	1,619	191,528	118.3	1,532	146,766	95.8	1,601	180,475	112.7
Peel	3,500	425,250	121.5	3,218	276,104	85.8	2,974	317,756	106.8
York	7,520	1,049,040	139.5	8,244	867,269	105.2	7,613	824,036	108.2
Ontario	5,019	766,903	152.8	4,492	457,286	101.8	4,231	541,341	127.9
Durham	3,227	489,536	151.7	3,195	313,430	98.1	3,155	404,596	128.2
Northumberland	4,491	587,872	130.9	4,699	476,949	101.5	4,353	478,431	109.9
Prince Edward	2,018	268,738	133.2	2,324	181,737	78.2	2,375	227,650	95.9
Totals	33,458	4,616,546	138.0	33,670	3,251,595	96.6	31,836	3,599,490	113.1
Lennox and Addington	3,306	456,889	138.2	3,081	265,890	86.3	3,244	373,627	115 2
Frontenac	4,059	632,392	155.8	4,299	361,116	84.0	4,048	420,958	104.0
Leeds and Grenville	7,221	1,164,747	161.3	7,391	753,143	101.9	7,285	881,153	121.0
Dundas	2,478	436,128	176.0	2,216	365,640	165.0	2,423	351,346	145.0
Stormont	2,188	264,310	120.8	1,985	218,350	110.0	2,058	247,212	120.1
Glengarry	2,436	343,720	141.1	2,275	251,843	110.7	2,438	283,717	116.4
Prescott	2,472	462,511	187.1	2,195	358,005	163.1	2,386	326,651	136.9
Russell	1,648	246,541	149.6	1,434	176,382	123.0	1,510	163,090	108.0
Carleton	6,127	1,044,654	170.5	6,309	808,814	128.2	6,079	826,128	135.9
Renfrew	4,379	784,717	179.2	3,814	497,346	130.4	3,831	592,111	154.6
Lanark	3,726	612,927	164.5	3,336	421,337	126.3	3,565	509,499	142.9
Totals	40,040	6,449,536	161.1	38,335	4,477,866	116.8	38,867	4,975,492	128.0
Victoria	3,235	480,398	148.5	3,490	484,761	138.9	3,165	419,284	132.5
Peterborough	3,194	426,399	133.5	3,190	351,857	110.3	2,738	332,281	121.4
Haliburton	661	111,841	169.2	720	87,840	122.0	682	93,486	137.1
Hastings	5,436	771,912	142.0	5,311	517,823	97.5	5,747	694,015	120.8
Totals	12,526	1,790,550	142.9	12,711	1,442,281	113.5	12,332	1,539,066	124.8
Muskoka	1,430	242,385	169.5	1,395	176,886	126.8	1,362	190,119	139.6
Parry Sound	1,363	231,437	169.8	1,107	159,962	144.5	823	126,918	154.2
Nipissing	582	100,046	171.9	431	60,340	140.0	101	16,038	158.8
Algoma	1,119	223,800	200.0	1,067	186,725	175.0	776	136,681	176.1
Totals	4,494	797,668	177.5	4,000	583,913	146.0	3,062	469,756	153.4
The Province	160,218	24,055,886	150.1	158,094	17,561,117	111.1	155,449	18,840,683	121.2

AREA AND PRODUCE—MANGEL-WURZELS.

TABLE XIX. Showing by County Municipalities and groups of Counties the area and produce of Mangel-wurzels in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-'91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre	Acres.	Bushels.	Bush. per acre.
Essex	273	91,182	334	219	128,334	586	203	80,629	397
Kent	457	229,871	503	471	220,428	468	316	132,174	418
Elgin	464	280,256	604	345	133,170	386	304	128,636	423
Norfolk	309	148,629	481	248	90,024	363	225	88,574	394
Haldimand	164	50,184	306	208	86,320	415	173	57,592	333
Welland	179	93,259	521	116	43,036	371	154	64,450	419
Totals	1,846	893,381	484	1,607	701,312	436	1,375	552,055	401
Lambton	625	331,875	531	445	194,465	437	417	170,788	410
Huron	1,834	1,028,874	561	2,155	1,038,710	482	1,581	730,955	462
Bruce	433	207,407	479	770	329,560	428	446	188,359	422
Totals	2,892	1,568,156	542	3,370	1,562,735	464	2,444	1,090,102	446
Grey	409	161,964	396	646	260,338	403	381	166,071	436
Simcoe	488	235,216	482	583	237,281	407	615	251,006	408
Totals	897	397,180	443	1,229	497,619	405	996	417,077	419
Middlesex	2,047	1,242,529	607	1,758	812,196	462	1,441	644,407	447
Oxford	1,708	1,006,012	589	1,652	751,660	455	1,304	619,826	475
Brant	408	257,040	630	404	204,828	507	360	183,057	508
Perth	2,027	1,029,716	508	2,862	1,419,552	496	1,713	816,599	477
Wellington	1,373	665,905	485	1,433	654,881	457	992	439,590	443
Waterloo	616	333,872	542	697	286,467	411	502	218,346	435
Dufferin	168	79,800	475	140	73,500	525	128	52,941	414
Totals	8,347	4,614,874	553	8,946	4,203,084	470	6,440	2,974,766	462
Lincoln	248	124,992	504	203	89,726	442	244	96,157	394
Wentworth	403	221,247	549	585	283,725	485	443	218,122	492
Halton	444	267,732	603	577	259,650	450	437	206,476	472
Peel	405	168,075	415	446	182,414	409	450	175,871	391
York	1,588	747,948	471	1,925	866,250	450	1,739	790,754	455
Ontario	727	363,500	500	988	529,568	436	779	354,574	455
Durham	399	227,829	571	711	284,400	400	469	205,670	439
Northumberland	508	236,728	466	491	225,860	460	463	199,500	431
Prince Edward	137	41,100	300	101	35,350	350	125	36,071	289
Totals	4,859	2,399,151	491	6,027	2,756,943	457	5,149	2,283,195	443
Lennox and Addington	90	45,270	503	108	40,500	375	127	44,411	350
Frontenac	215	84,925	395	87	27,057	311	183	64,847	354
Leeds and Grenville	280	135,520	484	237	87,216	368	229	96,952	423
Dundas	156	103,116	661	81	26,730	330	108	46,074	427
Stormont	62	27,900	450	60	18,000	300	35	13,450	384
Glengarry	116	71,920	620	89	30,082	338	72	26,090	362
Prescott	53	24,115	455	202	84,234	417	83	31,121	375
Russell	142	65,746	463	243	106,920	440	80	30,027	375
Carleton	789	345,582	438	1,073	391,645	365	597	224,200	376
Renfrew	102	45,186	443	109	31,553	317	104	37,167	357
Lanark	161	69,391	431	158	75,524	478	142	57,261	403
Totals	2,166	1,018,671	470	2,447	922,461	377	1,760	671,600	382
Victoria	709	359,463	507	757	355,790	470	560	264,536	472
Peterborough	254	118,618	467	443	178,086	402	300	111,823	373
Haliburton	7	2,317	331	12	3,900	325	7	2,312	330
Hastings	902	378,840	420	1,064	395,808	372	434	148,717	343
Totals	1,872	859,238	459	2,276	933,584	410	1,301	527,388	405
Muskoka	52	17,108	329	40	13,480	337	50	13,398	268
Parry Sound	14	6,300	450	5	1,500	300	10	2,511	251
Nipissing	3	1,164	388	1	300	300	1	146	146
Algoma	13	4,225	325	5	1,500	300	20	5,858	293
Totals	82	28,797	351	51	16,780	329	81	21,913	271
The Province	22,961	11,779,448	513	25,953	11,594,518	447	19,546	8,538,096	437

AREA AND PRODUCE—CARROTS.

TABLE XX. Showing by County Municipalities and groups of Counties the area and produce of Carrots in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	105	28,455	271	104	35,152	338	91	22,907	252
Kent	179	69,273	387	232	74,936	323	156	46,183	296
Elgin	213	105,009	493	222	79,254	357	161	53,265	331
Norfolk	161	56,672	352	276	68,724	249	152	43,310	285
Haldimand	86	20,296	236	87	27,753	319	87	22,800	262
Welland	90	26,010	289	61	13,237	217	81	22,756	281
Totals	834	305,715	367	982	299,056	305	728	211,221	290
Lambton	233	82,182	354	265	87,980	332	201	60,735	302
Huron	480	202,080	421	422	160,782	381	498	194,715	391
Bruce	269	97,647	363	361	122,379	339	302	99,041	328
Totals	982	382,209	389	1,048	371,141	354	1,001	354,491	354
Grey	430	151,790	353	583	211,046	362	530	193,860	366
Simcoe	473	192,511	407	562	206,254	367	577	210,140	364
Totals	903	344,301	381	1,145	417,300	364	1,107	404,000	365
Middlesex	555	274,725	495	655	230,560	352	496	165,414	333
Oxford	313	151,492	484	354	126,732	358	351	141,494	403
Brant	143	66,638	466	196	88,592	452	206	86,822	421
Perth	270	122,580	454	491	194,636	394	409	159,276	389
Wellington	271	112,194	414	380	139,080	366	304	101,632	334
Waterloo	297	136,323	459	375	145,875	389	328	135,825	414
Dufferin	36	11,268	313	109	34,117	313	139	46,624	335
Totals	1,885	875,220	464	2,563	959,592	374	2,233	837,087	375
Lincoln	80	27,680	346	108	35,100	325	114	35,987	316
Wentworth	320	131,840	412	239	93,688	392	238	88,307	371
Halton	63	25,137	399	105	38,640	368	118	47,124	399
Peel	196	56,056	286	238	81,634	343	292	100,570	344
York	411	162,756	396	818	330,472	404	693	284,198	410
Ontario	269	108,676	404	482	209,670	435	488	189,711	389
Durham	244	104,920	430	575	186,300	324	486	180,442	371
Northumberland	238	79,968	336	288	103,392	359	272	92,467	340
Prince Edward	96	21,600	225	65	18,590	286	65	13,695	211
Totals	1,917	718,633	375	2,918	1,097,486	376	2,766	1,032,501	373
Lennox and Addington	57	20,634	362	59	21,417	363	59	17,109	290
Frontenac	287	98,728	344	126	24,066	191	179	46,220	258
Leeds and Grenville	329	105,609	321	293	90,830	310	188	58,990	314
Dundas	225	112,275	499	86	34,400	400	73	27,303	374
Stormont	52	19,084	367	36	9,000	250	44	12,286	279
Glengarry	115	37,950	330	36	9,000	250	50	12,971	259
Prescott	42	15,204	362	39	11,739	301	43	13,821	282
Russell	217	86,800	400	240	73,440	306	146	47,485	325
Carleton	545	197,290	362	978	303,180	310	577	188,507	327
Renfrew	145	47,995	331	83	32,204	388	108	33,107	307
Lanark	216	68,040	315	165	68,805	417	141	48,859	347
Totals	2,230	809,609	363	2,141	678,081	317	1,614	506,688	314
Victoria	225	90,000	400	281	91,606	326	293	108,200	369
Peterborough	346	123,176	356	432	177,984	412	338	109,550	324
Haliburton	43	12,814	298	25	8,500	340	22	6,683	304
Hastings	219	63,948	292	251	68,021	271	170	48,842	287
Totals	833	289,938	348	989	346,111	350	823	273,275	332
Muskoka	115	40,595	353	100	25,000	250	82	22,363	273
Parry Sound	100	29,700	297	57	9,975	175	36	9,373	260
Nipissing	3	960	320	10	2,000	200	1	296	296
Algoma	56	17,136	306	24	4,800	200	32	8,052	252
Totals	274	88,391	323	191	41,775	219	151	40,084	265
The Province	9,858	3,814,016	387	11,977	4,210,542	352	10,423	3,659,347	351

AREA AND PRODUCE—TURNIPS.

TABLE XXI. Showing by County Municipalities and groups of Counties the area and produce of Turnips in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the yield per acre.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.	Acres.	Bushels.	Bush. per acre.
Essex	230	52,900	230	174	65,250	375	202	55,942	277
Kent	401	176,039	439	404	144,632	358	350	123,205	352
Elgin	421	225,235	535	402	140,700	350	363	130,494	359
Norfolk	1,362	644,226	473	1,306	428,368	328	1,028	393,395	383
Haldimand	159	52,152	328	84	29,400	350	122	35,719	293
Welland	143	54,483	381	209	50,787	243	169	56,559	335
Totals	2,716	1,205,035	444	2,579	859,137	333	2,234	795,314	356
Lambton	538	229,726	427	302	93,620	310	324	108,186	334
Huron	7,592	4,304,664	567	6,620	2,992,240	452	6,752	2,731,811	405
Bruce	7,006	3,755,216	536	5,714	2,445,592	428	5,733	2,331,971	407
Totals	15,136	8,289,606	548	12,636	5,531,452	438	12,809	5,171,968	404
Grey	10,546	5,905,760	560	9,794	4,044,922	413	9,132	3,777,954	414
Simcoe	4,636	2,679,608	578	3,551	1,633,460	460	3,476	1,479,333	426
Totals	15,182	8,585,368	565	13,345	5,678,382	426	12,608	5,257,287	417
Middlesex	1,468	904,288	616	1,822	624,946	343	1,674	633.708	379
Oxford	6,447	4,126,080	640	5,905	2,486,005	421	5,439	2,382,598	438
Brant	3,484	2,275,052	653	3,383	1,502,052	444	2,780	1,296,242	466
Perth	5,327	3,201,527	601	4,687	2,001,349	427	4,700	1,885,901	401
Wellington	13,468	8,148,140	605	12,994	5,327,540	410	12,964	5,621,698	434
Waterloo	5,146	2,825,154	549	4,780	1,940,680	406	5,059	2,045,808	404
Dufferin	3,074	1,718,366	559	2,745	1,092,510	398	2,452	969,109	395
Totals	38,414	23,198,607	604	36,316	14,975,082	412	35,068	14,835,064	423
Lincoln	256	112,384	439	262	94,320	360	235	82,630	352
Wentworth	2,932	1,700,560	580	3,073	1,545,719	503	2,504	1.188,008	474
Halton	2,071	1.168,044	564	1,728	886,464	513	1,733	781,832	451
Peel	2,056	1,003,328	488	1,381	615,926	446	1.398	535,908	383
York	5,053	2,587,136	512	4,410	1,869,840	424	3,498	1,412,937	404
Ontario	14,545	7,312,480	544	12,809	6,276,410	490	11,989	5,011,268	418
Durham	6,309	3,444,714	546	5,224	2,173,184	416	5,244	2,279,072	435
Northumberland	4,142	1,992,302	481	3,524	1,585,800	450	3,247	1,294,150	399
Prince Edward	127	48,260	380	98	37,338	381	117	27,976	239
Totals	37,491	19,969,208	533	32,509	15,085,001	464	29,965	12,613,781	421
Lennox and Addington	144	58,608	407	96	25.632	267	149	38,084	256
Frontenac	650	230,750	355	255	67,320	264	405	115,075	284
Leeds and Grenville	476	214,676	451	393	141,087	359	280	104,247	372
Dundas	60	29,520	492	71	20,093	283	65	19,732	304
Stormont	46	25,898	563	141	53,580	380	86	23,943	278
Glengarry	64	35,200	550	44	23,100	525	39	15.279	392
Prescott	180	90,720	504	62	20,336	328	115	44,514	387
Russell	534	257.922	483	573	236,649	413	332	134,671	406
Carleton	1,810	946,630	523	2,520	957,600	380	1,564	575,965	368
Renfrew	877	400,789	457	726	241,758	833	628	212,436	338
Lanark	677	328,345	485	479	180,583	377	491	181,822	370
Totals	5,518	2,619,058	475	5,360	1,967,738	367	4,154	1,465,768	353
Victoria	4,064	1,934,464	476	3,386	1,185,100	350	3,358	1,286,259	383
Peterborough	2,326	1,128,110	485	1,649	659,600	400	1,319	487,640	370
Haliburton	329	121,401	369	275	84,425	307	314	89,759	286
Hastings	1,312	494,624	377	835	265,530	318	886	257.913	291
Totals	8,031	3,678,599	458	6,145	2,194,655	357	5,877	2,121,571	361
Muskoka	1,087	418,495	385	796	299,296	376	980	310,939	317
Parry Sound	1,468	507,928	346	740	209,420	283	693	219,566	317
Nipissing	236	91,804	389	112	33,600	300	35	12,541	358
Algoma	796	289,744	364	517	206,800	400	520	177,481	341
Totals	3,587	1,307,971	365	2,165	749,116	346	2,228	720,527	323
The Province	126,075	68,853,452	546	111,055	47,040,563	424	104,943	42,981,280	410

RATIOS OF AVERAGE PRODUCTION.

TABLE XXII. Showing by County Municipalities and groups of Counties the per cent. ratios of total yields in 1891 to average of total yields for the ten years 1882-91.

Counties.	Fall wheat.	Spring wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buckwheat.	Beans.	Hay and clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.
Essex	148	133	137	111	67	53	114	285	209	93	92	113	124	95
Kent	136	134	122	120	105	60	125	170	163	79	107	174	150	143
Elgin	139	78	126	111	52	149	117	169	221	77	128	218	197	173
Norfolk	148	134	82	113	79	143	103	115	30	86	99	168	131	164
Haldimand	130	144	44	85	38	100	73	96	95	51	68	87	89	146
Welland	135	46	93	115	71	120	124	225	198	72	95	145	114	96
Group	139	120	90	110	73	114	116	162	167	76	101	162	145	152
Lambton	156	126	88	140	49	113	180	192	187	98	134	194	136	212
Huron	117	115	82	123	143	147	148	188	108	74	133	141	104	158
Bruce	104	121	77	133	127	141	230	208	165	63	149	110	99	161
Group	122	119	82	130	114	141	177	196	165	76	139	144	108	160
Grey	97	84	68	132	94	128	174	188	148	81	121	98	78	156
Simcoe	119	113	102	130	82	139	196	208	141	89	135	94	92	181
Group	112	98	88	131	84	133	187	199	145	84	128	95	85	163
Middlesex	137	57	103	116	92	146	145	107	116	86	141	193	166	143
Oxford	138	86	95	126	56	147	145	152	48	91	145	162	107	173
Brant	134	103	75	119	51	153	116	89	23	79	138	140	77	176
Perth	122	131	91	134	5	136	251	126	37	73	132	126	77	170
Wellington	76	165	92	137	79	110	183	166	49	79	123	151	110	145
Waterloo	116	84	107	133	76	146	151	181	23	56	116	153	100	138
Dufferin	80	147	103	144	53	137	226	283	349	97	131	151	24	177
Group	123	126	94	129	63	133	145	134	67	80	132	155	105	156
Lincoln	126	108	63	101	24	106	128	142	107	68	118	130	77	136
Wentworth	113	172	75	101	79	119	131	106	118	66	141	101	149	143
Halton	104	153	63	121	129	111	198	95	25	60	106	130	53	149
Peel	96	159	79	140	31	123	207	175	39	80	134	96	56	187
York	104	117	88	137	56	123	185	217	95	93	127	95	57	183
Ontario	74	135	85	133	43	142	117	391	80	81	142	103	57	158
Durham	141	111	86	134	62	143	169	348	137	75	121	111	58	151
Northumberland	110	107	64	130	80	139	171	196	85	65	123	119	86	154
Prince Edward	247	79	68	134	71	181	140	140	45	88	118	114	158	173
Group	109	124	79	129	68	134	147	194	87	76	128	105	70	158
Lennox and Addington	197	63	57	127	58	144	196	182	206	104	122	102	121	154
Frontenac	75	133	56	136	92	127	202	170	78	90	150	131	214	201
Leeds and Grenville	59	101	99	131	44	130	233	122	136	58	132	140	179	206
Dundas	61	110	82	125	49	115	273	158	114	70	124	224	411	150
Stormont	24	101	120	114	64	117	238	137	152	70	107	207	155	108
Glengarry	41	125	118	126	....	97	281	135	129	46	121	276	293	230
Prescott	....	133	140	124	....	118	248	126	137	109	142	77	110	204
Russell	33	131	175	139	213	93	349	169	94	92	151	219	183	192
Carleton	10	171	167	143	32	126	284	130	88	88	126	154	105	164
Renfrew	27	114	104	131	102	115	251	171	120	73	133	122	145	189
Lanark	62	138	114	149	63	129	183	100	113	63	120	121	139	181
Group	74	128	87	133	66	122	238	137	121	75	130	152	160	179
Victoria	41	128	95	130	76	129	134	408	148	81	115	136	83	150
Peterborough	58	143	47	133	92	127	183	258	100	70	128	106	112	231
Haliburton	90	151	94	116	84	142	110	295	173	61	120	100	192	135
Hastings	129	64	55	122	50	139	189	173	73	62	111	255	131	192
Group	78	121	70	128	61	132	182	222	96	68	116	163	106	173
Muskoka	41	79	131	126	35	167	129	181	94	48	127	128	182	135
Parry Sound	120	67	135	171	88	215	239	152	180	135	182	251	317	231
Nipissing	....	580	434	583	685	529	654	580	785	269	624	797	324	732
Algoma	140	89	138	122	106	166	171	344	33	74	164	72	213	163
Group	128	87	140	146	88	180	174	219	184	80	170	131	221	182
The Province	121	121	83	128	67	132	143	166	148	77	128	138	104	160

RATIOS OF AVERAGE YIELD PER ACRE.

TABLE XXIII. Showing by County Municipalities and groups of Counties the per cent. ratios of average yields per acre in 1891 to average yields per acre for ten years 1882-91.

Counties.	Fall wheat.	Spring wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buckwheat.	Beans.	Hay and Clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.
Essex	124	118	103	101	103	99	99	102	87	80	94	84	108	83
Kent	130	117	109	109	102	100	109	121	92	72	103	120	131	124
Elgin	141	125	114	113	107	132	115	114	97	70	137	143	149	149
Norfolk	113	115	99	118	117	113	115	120	111	78	120	122	124	123
Haldimand	132	102	74	82	83	81	117	103	107	50	99	92	90	112
Welland	136	102	111	114	108	103	132	135	110	70	112	124	103	114
Group	134	111	103	107	112	107	108	121	94	70	111	121	127	125
Lambton	134	132	113	119	95	114	132	122	99	82	121	130	117	128
Huron	135	158	104	113	114	120	94	138	96	65	131	121	108	140
Bruce	131	136	112	113	102	116	105	134	135	54	144	114	111	132
Group	134	144	109	114	106	118	121	129	101	66	133	122	110	136
Grey	124	131	114	113	103	114	86	107	122	73	121	91	96	135
Simcoe	118	131	115	117	104	117	118	108	110	77	117	118	112	133
Group	120	131	115	114	103	116	103	107	116	75	119	106	104	135
Middlesex	142	134	114	114	118	130	127	135	107	80	142	136	149	163
Oxford	138	131	111	120	127	122	125	117	68	87	144	124	129	146
Brant	143	133	96	110	117	116	118	111	99	80	133	124	111	140
Perth	145	150	112	116	113	125	112	117	93	71	137	106	117	150
Wellington	131	145	111	116	99	110	104	85	104	71	124	109	124	139
Waterloo	123	146	103	115	121	118	113	101	97	56	123	125	111	136
Dufferin	118	143	111	114	112	105	97	120	99	87	112	115	93	142
Group	137	143	108	115	116	117	122	114	96	75	131	120	124	143
Lincoln	126	101	88	95	121	85	127	107	95	71	128	128	109	125
Wentworth	139	114	90	104	108	104	112	126	105	63	111	112	111	122
Halton	118	116	92	107	121	105	131	137	130	60	105	128	100	125
Peel	104	124	100	119	80	105	116	130	81	70	114	106	83	127
York	113	127	112	120	117	111	107	110	92	77	129	104	97	127
Ontario	115	130	110	116	94	124	111	103	79	77	119	110	104	130
Durham	115	126	116	115	107	121	130	105	122	71	118	130	116	125
Northumberland	91	126	114	122	94	126	120	110	98	59	119	114	99	121
Prince Edward	100	132	115	123	113	125	122	100	79	80	139	104	107	159
Group	115	127	110	116	101	115	120	106	97	71	122	112	101	127
Lennox and Addington	98	126	117	129	98	119	132	96	118	86	120	144	125	159
Frontenac	98	137	115	126	96	130	125	103	76	78	150	112	133	125
Leeds and Grenville	92	139	118	121	115	131	127	106	105	54	133	114	102	121
Dundas	117	141	109	123	105	123	124	95	102	64	121	155	133	161
Stormont	137	130	116	118	98	129	121	104	118	67	101	117	132	203
Glengarry	107	130	122	120	....	122	123	104	74	43	121	171	127	140
Prescott	....	132	111	120	....	162	144	105	90	84	137	121	128	130
Russell	150	149	127	130	120	123	139	116	96	83	139	123	123	119
Carleton	184	166	132	134	123	130	131	119	106	75	125	116	111	142
Renfrew	95	124	106	117	94	110	112	107	89	65	116	124	108	135
Lanark	93	142	117	132	102	125	103	111	95	61	115	107	91	131
Group	98	141	123	125	102	125	127	106	96	67	126	123	116	135
Victoria	113	134	124	118	108	118	81	96	113	68	112	107	108	124
Peterborough	92	122	105	111	96	122	108	86	123	58	110	125	110	131
Haliburton	130	127	103	115	106	103	106	135	119	54	123	100	98	129
Hastings	95	115	111	113	101	125	132	108	75	53	118	122	102	130
Group	96	127	117	115	100	121	124	98	96	59	115	113	105	127
Muskoka	92	123	112	111	103	117	104	103	97	47	121	123	129	121
Parry Sound	98	98	101	98	96	105	103	83	96	74	110	179	114	109
Nipissing	....	112	106	105	99	104	107	100	95	50	108	266	108	109
Algoma	122	111	107	81	111	100	143	104	77	48	114	110	121	107
Group	120	111	106	99	102	106	113	98	99	56	116	130	122	113
The Province	129	132	112	116	103	117	115	107	93	70	124	117	110	133

ACREAGE UNDER CROP; ALSO PASTURE AND ORCHARD.

TABLE XXIV. Showing by County Municipalitles and groups of Counties in Ontario the total area under crop enumerated in Tables VIII—XXI, for the years 1890 and 1891, with the yearly average for the ten years 1882-91 ; also the area in Pasture and in Orchard and Garden for the same period.

Counties.	Acres in crop.			Pasture.		Orchard and garden.		
	1891.	1890.	1882-91.	1891.	1890.	1891.	1890.	1882-91.
				Acres.	Acres.	Acres.	Acres.	Acres.
Essex	167,673	165,950	145,673	30,720	30,784	6,521	6,050	6,050
Kent	236,761	228,010	212,065	57,607	47,661	9,048	7,294	7,571
Elgin	175,344	179,476	168,186	71,812	68,604	7,037	7,031	7,025
Norfolk	157,849	165,103	155,232	43,677	39,299	7,187	7,626	7,708
Haldimand	140,251	146,604	141,766	38,148	35,488	4,326	4,446	4,525
Welland	112,319	111,812	110,850	27,225	24,271	6,683	7,070	6,792
Totals	990,197	996,955	933,772	269,189	246,107	40,802	39,517	39,671
Lambton	199,846	200,371	175,542	87,526	74,054	6,850	7,205	6,364
Huron	346,979	354,703	334,064	172,246	154,177	9,181	8,652	8,527
Bruce	297,453	296,860	277,482	121,806	111,753	6,136	5,743	5,739
Totals	844,278	851,934	787,088	381,578	339,984	22,167	21,600	20,630
Grey	366,230	366,695	359,152	147,403	141,680	7,151	6,741	7,169
Simcoe	330,331	329,666	309,981	87,220	72,881	4,707	5,117	4,731
Totals	696,561	696,361	669,133	234,623	214,561	11,858	11,858	11,900
Middlesex	307,085	315,485	304,771	173,524	166,959	10,009	10,336	10,407
Oxford	223,306	227,218	217,814	89,539	85,098	8,070	7,862	8,355
Brant	118,220	124,582	120,584	28,718	26,927	3,463	3,574	4,373
Perth	235,921	241,528	233,261	84,157	80,937	4,847	4,754	4,837
Wellington	307,642	315,676	296,555	87,228	85,925	4,922	4,378	4,826
Waterloo	172,459	175,268	165,531	31,677	32,732	4,840	4,948	5,119
Dufferin	139,849	139,408	126,084	36,015	35,033	1,553	1,486	1,506
Totals	1,504,482	1,539,165	1,464,600	530,858	513,612	37,704	37,338	39,453
Lincoln	100,602	103,252	101,598	22,931	22,747	8,139	8,150	7,938
Wentworth	141,298	146,854	143,388	36,567	35,020	8,891	8,861	9,033
Halton	106,451	110,523	107,254	34,269	33,493	4,992	4,859	4,850
Peel	172,618	176,051	163,925	37,134	33,399	4,175	4,207	4,216
York	313,952	311,787	301,490	53,382	53,467	6,603	6,285	7,508
Ontario	255,618	257,408	247,728	58,986	55,462	5,042	4,908	5,230
Durham	205,417	203,532	203,634	40,229	43,806	2,986	3,047	3,717
Northumberland	213,363	225,911	217,355	66,039	60,200	6,543	6,304	6,153
Prince Edward	126,434	133,996	130,388	30,090	31,469	5,596	5,817	6,090
Totals	1,635,753	1,669,314	1,616,760	379,627	369,063	53,267	52,438	55,035
Lennox & Add'n	135,126	149,268	140,084	59,352	44,636	2,850	2,358	2,758
Frontenac	146,118	141,160	141,331	55,565	56,476	1,889	1,964	2,173
Leeds & Gren	246,195	250,662	237,956	136,910	136,204	2,759	2,513	3,104
Dundas	90,699	88,834	86,413	39,360	40,413	1,218	1,252	1,191
Stormont	73,897	75,583	72,837	40,803	35,668	1,026	767	987
Glengarry	92,457	92,220	88,072	45,565	46,145	618	584	586
Prescott	97,386	100,991	86,327	38,860	29,763	335	284	291
Russell	54,606	58,382	50.273	22,562	19,047	39	54	136
Carleton	198,568	196,315	184,661	74,851	70,232	256	299	505
Renfrew	178,309	173,227	165,066	66,308	63,279	203	186	506
Lanark	150,088	147,795	141,799	113,787	99,734	818	837	1,058
Totals	1,463,449	1,474,437	1,397,819	693,923	641,597	12,011	11,098	13,295
Victoria	178,157	178,308	173,534	48,149	42,419	1,750	1,377	1,750
Peterborough	155,191	148,107	142,695	57,285	52,334	1,915	1,734	1,933
Haliburton	22,929	22,544	20,387	6,889	5,611	117	111	102
Hastings	215,478	220,158	221,517	88,966	94,939	5,348	5,108	5,398
Totals	571,755	569,117	558,133	201,289	195,303	9,130	8,330	9,183
Muskoka	41,132	42,056	38,064	11,305	8,776	581	422	380
Parry Sound	37,689	29,074	21,838	8,295	6,314	41	15	28
Nipissing	8,982	8,308	1,729	2,055	1,417	16	11	3
Algoma	39,935	35,576	28,670	8,539	5,358	255	169	163
Totals	127,738	115,014	90,301	30,194	21,865	893	617	574
The Province	7,834,213	7,912,297	7,517,696	2,721,281	2,542,092	187,832	182,796	189,741

RATIOS OF AREAS UNDER CROP.

TABLE XXV. Showing by County Municipalities and groups of Counties the number of acres under the various crops in Ontario in 1891, per 1,000 acres of cleared land.

Counties.	Fall wheat.	Spring wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buckwheat.	Beans.	Hay and clover.	Potatoes.	Mangel-wurzels.	Carrots.	Turnips.	Totals.
Essex	175.6	8.9	21.2	156.8	2.3	9.1	171.0	10.6	6.7	198 7	12.4	1.3	.5	1.1	776.2
Kent	200.0	13.1	24.7	118.2	2.4	19.8	97.2	4.2	84.1	181.6	11.1	1.5	.6	1.3	759.8
Elgin	150.6	3.6	19.0	113.3	2.2	52.4	51.7	7.4	11.8	194.4	9.2	1.6	.8	1.5	619.5
Norfolk	145.5	4.1	21.2	109.4	21.4	87.7	52.5	19.3	.6	194.3	11.7	1.3	.7	5.8	675.5
Haldimand	158.4	23.7	39.4	117.9	1.7	85.7	5.7	3.3	.7	244.9	5.1	.8	.4	.8	688.5
Welland	135.8	3.7	19.1	122.0	2.4	31.0	35.2	19.4	8.8	296.7	12.1	1.1	.5	.9	688.7
Group	163.9	9.5	23.9	122.1	5.4	46.7	71.6	9.9	23.2	211.4	10.3	1.3	.6	1.9	701.7
Lambton	127.5	18.7	35.7	154.6	.4	31.3	33.2	2.6	2.4	205.9	10.4	1.9	.7	1.7	627.0
Huron	97.1	20.5	37.8	152.4	.6	72.8	5.1	.7	.2	196.2	9.0	3.2	.9	13.3	609.8
Bruce	77.6	25.4	27.4	158.1	1.3	100.8	4.0	1.4	.3	215.6	10.6	.9	.6	15.0	639.0
Group	97.6	21.7	33.7	154.9	.8	72.7	11.3	1.4	.8	205.1	9.9	2.1	.7	11.2	623 9
Grey	35.7	44.0	22.6	185.1	.9	92.2	2.8	1.2	.3	228.2	12.1	.7	.7	18.6	645.1
Simcoe	108.0	59.5	54.9	146.6	3.7	78.1	3.1	1.7	.3	181.0	16.1	1.0	.9	9.3	664.2
Group	69.5	51.1	37.7	167.1	2.2	85.6	2.9	1.5	.3	206.2	14.0	.8	.8	14.3	654.0
Middlesex	130.0	8.0	25.8	141.5	.7	46.4	23.9	.8	.6	181.3	10.4	3.9	1.0	2.8	577.1
Oxford	109.3	16.6	40.8	159.1	1.5	55.7	29.4	2.5	.4	187.5	9.4	4.9	.9	18.4	636.4
Brant	156.0	5.3	84.1	116.1	2.6	73.4	27.2	3.0	.5	180.5	13.4	2.4	.8	20.2	685.5
Perth	97.2	28.3	38.1	180.4	.0	69.6	6.0	.3	.1	185.2	9.6	5.5	.7	14.3	635.3
Wellington	31.3	52.7	65.6	198.2	1.4	85.2	3.1	.9	.0	210.8	13.2	3.1	.6	30.5	696.6
Waterloo	150.4	10.9	73.1	173.7	1.3	76.6	7.3	.8	.0	176.3	11.1	2.5	1.2	21.1	706.3
Dufferin	32.5	105.5	54.9	193 9	1.6	79.2	1.3	1.4	.5	185.6	18.4	.8	.2	15.2	691.0
Group	98.4	29.7	49.5	167.3	1.2	67.0	14.4	1.2	.3	188.3	11.6	3.6	.8	16.6	649.9
Lincoln	139.4	15.4	20.4	124.2	.5	42.1	41.1	6.0	1.3	255.3	11.4	1.6	.5	1.7	660.9
Wentworth	114.5	20.8	52.3	133.6	3.3	60.5	25.5	3.0	1.0	223.2	20.7	1.9	1.5	14.0	675.8
Halton	111.3	32.2	52.2	130.3	3.4	67.4	12.0	.7	.0	198.3	9.6	2.6	.4	12.3	632.7
Peel	97.5	73.6	114.7	149.9	2.0	71.0	4.9	1.4	.1	180.7	14.6	1.7	.8	8.6	721.5
York	78.1	57.8	105.4	178.3	1.8	77.1	7.2	1.3	.3	213.1	18.1	3.8	1.0	12.2	755.5
Ontario	16.0	142.1	84.6	166.3	3.3	89.2	8.2	8.5	.7	159.4	14.5	2.1	.8	42.0	737.7
Durham	17.0	115.5	123.4	146.5	9.9	94.7	9.3	26.4	1.3	169.0	11.8	1.5	.9	23.0	750.2
Northumberland	43.8	72.4	75.1	101.5	29.7	71.0	19 0	37.3	1.4	186.5	14 0	1.6	.7	13.0	667.0
Prince Edward	36.1	20.7	123.6	81.7	29.5	112.2	38.5	55.4	1.4	181.4	11.1	.7	.5	.7	693.5
Group	65.2	70.0	88.3	140.4	9.2	77.8	15.7	15.1	.8	192.9	14.5	2.1	.8	16.3	709.1
Lennox & Add'n	22.9	13.5	85.1	104.2	13.3	51.7	17.3	29.9	1.5	283.5	15.7	.4	.3	.7	640.0
Frontenac	5.7	38.5	37.3	137.7	16.0	48.3	14.3	12.9	1.3	328.7	18.5	1.0	1.3	2.9	664.4
Leeds & Gren	7.1	21.9	21.1	168.9	5.0	14.8	28.5	15.1	1.2	280.8	17.1	.7	.8	1.1	584.1
Dundas	3.8	25.9	36.0	223.6	4.3	11.5	33.1	21.1	2.1	287.6	18.3	1.2	1.7	.4	670.6
Stormont	.8	27.7	20.4	188.6	2.3	18.4	23.4	22.6	2.0	278.0	17.9	.6	.4	.4	603.5
Glengarry	1.3	51.2	14.5	212.4	.0	29.6	16.1	9.6	1.3	264.8	16.3	.8	.8	.4	619.1
Prescott	.0	58.3	27.4	193.0	.0	42 4	17.4	13.2	5.5	305.1	17.3	.4	.3	1.2	681.5
Russell	.5	44.0	28.0	251.5	5.7	34.3	17.6	18.9	2.5	252.6	20.7	1.8	2.7	6.7	687.5
Carleton	.2	78.0	36.3	224.8	5.0	42.9	14.0	14.1	1.3	239.2	21.2	2.7	1.9	6.3	687.9
Renfrew	.9	82.9	5.4	173.3	27.5	81.1	4.8	7.1	2.5	260.1	16.3	.4	.5	3.3	666.1
Lanark	6.5	46.3	9.3	139.7	8.9	38.8	9.1	15.8	.9	202.5	12.3	.5	.7	2.2	493.5
Group	5.2	45.1	28.0	175.0	9.1	38.7	17.3	15.7	1.8	267.6	17.1	.9	.9	2.4	624.8
Victoria	10.8	121.6	91.5	175.0	3.4	70.8	4.2	17.3	.5	186.2	13.0	2.8	.9	16.3	714.3
Peterborough	27.5	135.1	25.1	162.0	14.6	70.3	3.4	14.8	.5	205.5	14.1	1.1	1.5	10.3	685.8
Haliburton	2.8	52.4	8.0	164.4	6.6	72.9	3.8	19.7	1.2	362.8	21.0	.2	1.4	10.5	727.7
Hastings	37.9	23.3	55.2	134.7	19.3	61.7	26.6	19.6	.9	237.4	16.1	2.7	.7	3.9	640.0
Group	25.8	83.4	56.1	155.0	12.9	67.1	12.9	17.6	.7	218.4	14.9	2.2	1.0	9.5	677.5
Muskoka	.5	15.6	11.6	188.0	2.2	76.5	4.9	11.3	.7	391.3	26.1	1.0	2.1	19.9	751.7
Parry Sound	1.2	18.9	18.9	195.7	6.1	69.9	2.1	4.3	.7	403.9	28.3	.3	2.1	30.5	782.9
Nipissing	.0	24.6	11.6	178.5	15.4	62.3	6.3	13.9	6.3	382.0	50.0	2	.2	20.3	771.6
Algoma	10.2	93.6	15.4	143.2	4.1	136.3	1.8	6.6	.1	341.8	22.2	.3	1.1	15.8	792.5
Group	3.6	41.0	14.9	175.9	4.9	91.9	3.2	8.0	.9	379.2	27.3	.4	1.7	21.8	774.7
The Province	72.0	43.3	46.9	156.0	5.7	63.8	20.4	9.1	3 5	216.1	13.6	1.9	.8	10.7	663.8

PART II.

LIVE STOCK, THE DAIRY AND THE APIARY.

LIVE-STOCK.

The following paragraph is taken from the May bulletin: "With the exception of horses, which suffered from various forms of distemper, live stock appear to have come through the winter in fair condition. Several cases of strangles are reported among horses, but the most common complaint, and one which was reported in nearly every district, was an influenza which in a number of instances developed into inflammation, resulting fatally in some cases. A few correspondents in both the east and west state that the mortality among brood mares and foals was unusually large. Cattle began the season rather thin, for although there was an abundance of hay, more especially along the frontier counties, coarse grains and mill feed were scarce and expensive. In a few localities the cows were attacked by something like la grippe, and a single mention is made of a supposed case of tuberculosis, but the general health of horned cattle may be ranked as excellent. Odd cases of grub in the head are reported among sheep, but the general condition of this class of live stock is first class. Many correspondents remark upon the vigorous conditions of the lambs dropped, notwithstanding the trying weather of March and April, when a few early lambs succumbed. Dogs are reported as doing much injury to sheep in various parts of the province. Swine are said to be remarkably free from disease. One case of hog cholera, which was at once stamped out, is the only serious disease mentioned by correspondents. While there was an abundance of fodder, it lacked in variety and feeding quality. Hay was so plentiful in some sections that it was wastefully fed, but corn, oats and other grains used for feeding purposes were at a premium and had to be doled out sparingly."

The August bulletin had the following regarding pastures and live stock: "In spite of the generally poor condition of pastures, the present state of live stock leaves but little to be desired. Live stock generally are in a thrifty and healthy condition—in many cases unusually so. If there is complaint at all it is that cattle are in some instances a little deficient in flesh for this season of the year, but at the same time the flesh is firm and the condition is healthy. A considerable number of cattle have already been sold for the foreign market. The reports respecting pasture lands are very conflicting, but there can be no denying that they have not been nearly so good as would have been desired. Pastures did not get a good start, and were not in a condition to stand well the drouth of the first half of the summer. In many parts of the province local rains have been more or less plentiful since the first week in July, and the outlook for fall pastures has thus been materially improved. This was specially the case throughout the eastern half of the province, and more particularly in the St. Lawrence counties. Grey, Bruce and Simcoe, and the Lake Ontario counties have participated more or less in the improvement, but the reports are by no means unanimous. Throughout the Lake Erie district, and particularly in the counties of Essex, Elgin and Kent, the condition of pastures is the most unfavorable, being very bare and brown, and there will likely

be some difficulty as to the supply of fall feed. There is nowhere much uneasiness as to the prospects for winter feed however. Although the hay crop was so light, straw and coarse grains are abundant, and the root crop is likely to be a very fair one."

The following is the summary contained in the November bulletin: "Owing to the long continued drouth and the uneven distribution of rain this fall, the reports as to pastures are variable. From Essex in the west, along lakes Erie and Ontario, and in the eastern part of the province, the grass has been short and thin, the corn crop having been utilised in many places to supplement the bare pastures. In the counties bordering on Lake Huron the grass has been exceedingly good, and so also in most of Muskoka and Algoma. In the West Midland counties the pastures have been above the average. Cattle, even in the regions of short pasturage, are going in in good condition. The reports as to the good conditions of all kinds of stock are practically unanimous. In the east most of the available sheep, hogs and cattle have been bought for the Montreal market, but there appears to be enough left for local demand. The fattening of cattle and sheep will be confined to the western part of the province. Hogs are the most plentiful, and in some counties in the west this branch of agriculture has greatly increased. Market supplies are reported more than equal to the demand, but complaints as to low prices are very common. In regard to food supplies for the winter the only lack is in the matter of hay, but as there is an abundance of straw, corn stalks and roots, this will not be felt. Nearly all the correspondents agree that if moderate economy is practised there is abundance of fodder for winter requirements."

HORSES. The following table gives the number of horses by classes in 1890 and 1891, by county groups and for the province, and also the total number of horses in each district and for the province in each of the five years 1887-91:

Horses.		Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern District	The Province.
Working horses	1891	44,716	32,528	27,526	63,360	71,777	62,318	22,176	4,335	328,736
	1890	42,394	31,238	26,329	62,351	69,231	61,305	22,191	3,421	318,460
Breeding mares	1891	17,494	15,578	10,952	25,990	25,803	21,621	8,055	1,695	127,188
	1890	19,498	15,615	11,167	26,479	26,995	22,038	7,863	1,498	131,153
Unbroken horses	1891	34,512	27,251	17,683	43,5[illegible]	46,1[illegible]	36,821	14,525	2,078	222,535
	1890	32,343	25,365	16,201	40,8[illegible]	44,34[illegible]	35,616	13,7[illegible]	1,595	210,023
Total	1891	96,722	75,357	56,161	132,879	143,716	120,760	44,756	8,108	678,459
	1890	94,235	72,218	53,697	129,641	140,571	118,959	43,801	6,514	659,636
	1889	84,975	66,750	52,855	124,325	131,551	111,250	42,135	4,954	618,795
	1888	81,481	63,098	50,240	119,001	127,929	109,161	40,763	4,545	596,218
	1887	77,539	59,936	47,774	114,529	125,713	105,900	39,938	4,032	575,361

An increase has taken place in the number of working horses in every district except the East Midland, where a slight falling off is noticed, and an increase in the number of unbroken horses is experienced in every group; but, with the exception of the East Midland counties and the Northern Districts, the number of breeding mares falls behind that of the previous year in every group. The total number of horses of all classes is 678,459, being 18,823 more than in the preceding year. The greatest number of horses is found in the Lake Ontario district, the West Midland and St. Lawrence and Ottawa counties coming next in order.

HOGS. In the next table the total number of swine is given for the five years 1887-91, by county groups and for the province. The animals are also divided into the two classes over and under one year for the two years 1890 and 1891 :

Hogs.		Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.
Over 1 year..	1891	39,535	18,467	21,692	36,596	35,959	46,734	20,967	4,175	224,125
	1890	46,732	21,057	18,892	37,047	36,330	49,909	19,152	3,095	232,194
Under 1 year.	1891	183,849	83,828	82,908	206,747	183,526	115,354	61,897	14,082	932,191
	1890	195,903	86,469	76,736	202,263	174,655	106,714	56,047	9,578	908,365
Total	1891	223,384	102,295	104,600	243,343	219,485	162,088	82,864	18,257	1,156,316
	1890	242,635	107,506	95,628	239,310	210,985	156,623	75,199	12,673	1,140,559
	1889	197,015	73,096	74,104	171,444	148,233	115,645	48,411	7,521	835,469
	1888	186,184	71,343	72,852	165,407	148,291	118,387	49,413	7,202	819,079
	1887	185,843	69,700	71,015	162,601	154,678	126,061	56,799	6,120	832,817

The decrease in the number of hogs over one year old is more than made up by the increase in the number of hogs under one year, the total number of swine in the province for the year being 1,156,316 or 15,757 more than in the previous year. In the Lake Erie and Lake Huron counties, however, a decrease is observed in the total number of hogs. The West Midland, Lake Erie and Lake Ontario groups are the leading districts for raising pork.

HORNED CATTLE. The following table gives the number of cattle by classes in 1890 and 1891, together with that of all kinds of cattle in each of the five years 1887-91, by county groups and for the province :

Cattle.		Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland	Northern Districts.	The Province.
Working oxen	1891..	918	724	863	562	463	697	903	1,586	6,716
	1890..	1,497	911	1,559	810	781	798	1,921	1,890	10,167
Milch cows...	1891..	83,912	73,129	56,171	152,483	122,929	210,596	61,351	12,663	773,234
	1890..	86,520	74,690	56,281	155,643	121,643	209,490	62,380	11,191	777,838
Store cattle	1891.	42,023	65,943	40,106	90,768	43,812	52,701	18,470	5,495	359,318
over 2 years	1890..	42,125	69,048	36,442	87,420	42,495	47,637	18,106	4,367	347,640
Young and	1891..	92,756	118,545	84,374	184,967	124,267	158,097	58,118	18,423	839,547
other cattle.	1890..	92,484	107,087	76,493	170,386	107,072	141,553	49,498	14,494	759,067
Totals.....	1891	219,609	258,341	181,514	428,780	291,471	422,091	138,842	38,167	1,978,815
	1890	222,626	251,736	170,775	414,259	271,991	399,478	131,905	31,942	1,894,712
	1889	224,401	250,936	172,527	417,907	293,214	374,038	132,928	25,948	1,891,899
	1888	226,331	249,858	175,020	418,438	300,757	395,656	136,891	25,687	1,928,638
	1887	232,334	244,961	170,157	429,356	312,483	395,230	138,977	24,766	1,948,264

The number of oxen in the province has fallen from 10,167 to 6,716, which means a decrease of fully one-third in the year, shared by every district. There are also less milch cows than in 1890, although an increase has occurred in the St. Lawrence and Ottawa group (the banner dairy district) and the Northern Districts. Store cattle have increased in the province generally, but not in the Lake Erie and Lake Huron counties. Each

district has more young cattle than in the previous year. The total number of cattle in the province is greater than in any year of the table, and falls very little short of two million head. The largest number of cattle is found in the West Midland group, where beef animals are most largely raised.

SHEEP. The following table presents by county groups and for the province the number of sheep over and under one year, and also the total number in each of the five years 1887-91 :

Sheep.		Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.
Over 1 year..	1891..	105,692	126,263	116,066	179,218	147,705	182,663	58,148	19,958	935,713
	1890..	99,594	107,747	98,551	150,078	111,970	165,200	46,074	16,049	795,263
Under 1 year	1891..	88,834	109,905	89,291	149,144	115,348	144,503	45,461	15,552	758,038
	1890..	73,365	80,114	64,587	105,325	77,110	102,011	30,654	11,266	544,432
Totals.....	1891	194,526	236,168	205,357	328,362	263,053	327,166	103,609	35,510	1,693,751
	1890	172,959	187,861	163,138	255,403	189,080	267,211	76,728	27,315	1,339,695
	1889	146,038	172,656	167,947	257,840	214,475	275,905	89,084	20,235	1,344,180
	1888	147,428	167,270	163,944	254,755	223,363	283,237	91,045	18,002	1,349,044
	1887	152,850	169,459	167,592	258,590	216,450	315,130	97,805	18,285	1,396,161

Both classes of sheep, but more especially those under one year, have increased in every group, making the total number 1,693,751 against 1,339,695 in 1890—an increase of 354,056 for the year. The West Midland group this year leads in the total number of sheep, the St Lawrence counties falling to second place.

THE WOOL CLIP. The number of fleeces, with the total and average weights, is given in the following table by county groups and for the province for 1890 and 1891, together with the average for the ten years 1882-91 :

Districts.	1891.			1890.			1882-91.		
	Fleeces.	Pounds.	lb. per fleece.	Fleeces.	Pounds.	lb. per fleece.	Fleeces.	Pounds.	lb. per fleece.
Lake Erie.....	107,140	617,849	5.77	99,241	553,372	5.58	106,730	595,926	5.58
Lake Huron.....	130,610	771,148	5.90	108,948	650,357	5.97	122,367	702,077	5.74
Georgian Bay ...	118,674	683,221	5.76	99,818	567,196	5.68	114,793	635,334	5.53
West Midland...	181,513	1,095,574	6.04	151,915	893,332	5.89	190,743	1,090,165	5.72
Lake Ontario....	151,182	940,130	6.22	114,650	681,544	5.94	157,522	929,790	5.90
St. Law. & Ottawa	185,836	958,542	5.16	168,454	874,573	5.19	221,079	1,081,018	4.89
East Midland ...	59,023	314,571	5.33	47,888	261,926	5.47	66,696	346,721	5.20
North'n Districts	20,544	117,106	5.70	16,572	92,400	5.58	12,494	70,196	5.62
The Province	954,522	5,498,141	5.76	807,486	4,574,700	5.67	992,424	5,451,227	5.49

In every district there is an increase in the number of fleeces compared with the previous year, but the total number falls behind the average for the ten years, 1882-91.

The average weight per fleece has increased from 5.67 in 1890 to 5.76 lb. in 1891, while the average for the ten years is only 5.49 lb. The total weight of the clip in the province is about one-fifth greater than in the previous year, and also exceeds the average for 1882-91. The sheep in the Lake Ontario and West Midland groups have the heaviest fleeces, while those of the St. Lawrence and Ottawa and East Midland Districts, as usual, carry the smallest amount of wool.

Poultry. In reply to a question regarding the profits of poultry-keeping the greater part of our correspondents are candid enough to admit that they have not heretofore given the matter full consideration. A number advise the keeping of hens for cleaning up waste grain, etc., around the barnyard, while on the other hand it is claimed by several correspondents that fowls destroy more than they produce. Some of the comments on the effects of the McKinley Bill upon the egg and fowl trade are more vigorous than complimentary to the author of that bit of legislation. The loss of the Detroit market is particularly regretted in Essex and Lambton. The health of all classes of poultry is generally first-class, although a fatal disease amongst geese was reported from the township of Amabel, a dangerous swelling of the head amongst turkeys was complained of in the township of Westminster, and an unusual mortality amongst hens was observed in the townsbip of Downie. The table following shows the number of poultry in each class by county groups and for the province in 1890 and 1891, together with the total number for each of the five years, 1887-91:

Poultry.		Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts	The Province.
Turkeys.	1891	62,721	42,495	40,691	93,528	108,605	120,686	31,314	7,867	507,907
	1890	56,949	37,380	33,998	86,580	97,777	125,206	23,626	5,226	466,742
Geese ...	1891	50,035	57,542	47,920	84,475	91,394	89,479	30,946	6,499	458,290
	1890	49,941	50,826	45,588	83,214	88,222	87,914	27,500	5,517	438,722
Other fowls..	1891	808,986	685,672	515,226	1,229,683	1,191,489	1,097,341	416,887	94,699	6,039,893
	1890	786,317	690,432	504,854	1,254,594	1,164,132	1,081,643	386,511	80,917	5,949,400
Totals	1891	921,742	785,709	603,837	1,407,686	1,391,488	1 307,506	479,147	108,975	7,006,090
	1890	893,207	778,638	584,440	1,424,388	1,350,131	1,294,763	437,637	91,660	6,854,864
	1889	879,552	727,269	557,286	1,342,071	1,130,730	1,170,461	430.424	66,505	6,304,298
	1888	861,584	712,798	548,482	1,303,997	1,112,998	1,139,227	422,163	62,865	6,164.114
	1887	942,641	703,849	549,889	1,292,085	1,260,654	1,182,717	444,762	61,764	6,438,361

The figures for the province show an increase in the number of poultry in each class, the total number of domestic fowls now reaching 7,006,090, or 151,226 more than in 1890. The West Midland group still leads in the total number of poultry, but the Lake Ontario counties have the most geese and the St. Lawrence and Ottawa group the largest number of tu keys.

THE DAIRY.

The August bulletin had the following regarding the dairy business: "In the western part of the province, and particularly in Brant, the milk supply, which has held fairly well all through the summer, is now beginning to fail somewhat owing to the

unsatisfactory pasturage for milch cows. Cheese factories are reported to have had a favorable season in Lambton, and favorable reports for dairying also come from Middlesex, Oxford, Huron and Grey. Factories have had an active season in the eastern counties. The milk supply has been good and the dairy output has been a large one."

Regarding this subject the November bulletin ran as follows : Correspondents report the dairy as in a fairly prosperous condition during the season, although there was rather a scarcity of milk owing to the drouth. There appears to be an increasing interest in the manufacture of butter, and while in some localities both quality and price are said to be a little lower than last year, reports generally speak of an improved quality and a slight advance in price. A few allusions are made to the work of the Travelling Dairy, a Simcoe correspondent stating that "the Travelling Dairy has stirred up much interest." The cheese industry is strongly championed by many correspondents as against butter-making, but more references are made to factories closed during the year than to new ones opened. Correspondents have not yet arrived at a unanimous conclusion regarding the best breed of cow for the dairy. Durhams and their grades are to be most frequently found, as the majority of Canadian farmers have not yet given up the vain hope of a combined beef and milk animal. In the cheese producing counties of the St. Lawrence, however, the Ayrshire is a clear favorite as a milker. There has been a decided "boom" in Holsteins all over the province, and it is likely that this variety and its grades will soon take a large place in our dairies. The Jersey has some hearty admirers as a good cow for butter-makers, while the "native Canadian cow," that remarkable outcome of expediency and accident, and survivor of all sorts of usage, is still considered by a strong minority as equal to any of the above-named families if properly cared for.

Cheese Factories. The total number of factories reported to the Bureau as in operation in 1891 was 838, being 21 more than in the previous year, and eighty more than the average for the nine years 1883-91. The following table gives the statistics for these factories for each of the years named, based on the returns of factories which have reported during the several years, together with the annual averages for the nine years' period :

Year.	Factories in operation.	Quality of—		Gross value of cheese.	Average No. of patrons.	Average No. of cows.	Milk required to make 1 lb. cheese.	Value of cheese per 100 lb.	Average date of opening.	Average date of closing.
		Milk used.	Cheese made.							
	No.	lb.	lb.	$			lb.	$ c.		
1891...	838	865,453,574	81,929,042	7,656,484	45,066	296,194	10.56	9 35	May 4	Nov. 2
1890..	817	836,387,516	79,364,713	7,189,957	44,838	304,584	10.54	9 06	" 4	Oct. 31
1889...	784	760,146,327	72,592,847	6,787,619	43,215	273,231	10.47	9 35	" 4	" 30
1888...	737	686,369,013	65,299,751	6,031,470	42,065	256,780	10.51	9 24	" 5	" 24
1887...	737	691,934,579	65,638,656	6,918,913	42,512	254,510	10.54	10 54	" 4	" 27
1886...	770	654,703,243	63,721,621	5,893,818	37,665	237,106	10.27	9 25	" 7	" 29
1885...	752	733,437,254	71,209,719	5,781,569	44,208	260,244	10.30	8 12	" 4	" 29
1884...	751	685,964,727	66,939,573	6,998,889	38,646	254,852	10.25	10 46	" 3	" 30
1883...	635	539,696,197	53,513,032	5,589,339	32,636	193,840	10.08	10 45	" 3	" 30
1883-91	758	717,121,381	68,912,106	6,538,673	41,206	259,038	10.41	9 49	" 4	" 29

The number of factories includes only those in actual operation in the season 1891, and does not include private dairies. The figures show that 2,564,329 pounds of cheese were made in excess of the product of 1890, and thirteen million pounds more than the average annual output of nine years. The gross value is $466,527 higher than in 1890. The

number of patrons increased by 228, while the *average* number of cows shows a decrease. This latter item is not very reliable, as a great many base their figures on the old-fashioned "standard cow" of 3,000 pounds per factory season. An effort will be made to get at the milk producing power of the average dairy cow for the coming season. The quality of the milk must be decreasing, as evinced by the increased quantity of milk required to make a pound of cheese. The price of cheese recovered somewhat, and brought only 14 cents less per 100 pounds than the average for nine years. The season was two days longer than in 1890, the average date of opening remaining constant.

It is only after the utmost efforts that we have received returns from 702 factories on which the above estimates are based. Circulars were sent in some cases four times, and to the last was appended the following note :

DEAR SIR,—Your name has been reported to me as an officer of a cheese factory. Circulars have been mailed you, but as yet I have received no report for your factory. I am anxious to make these dairy statistics complete, but cannot do so without your co-operation. I am collecting this information in the hope that it is of some interest and value at least to the dairymen of this province. If I am mistaken I will gladly drop it, but would like to know any objection against giving this information. If you have no present connection with this factory I shall be obliged if you will forward this form to the president or secretary.

The following table shows the statistics of the average factory by county groups for 1890 and 1891. The average for nine years is also given for the province.(:)

Districts.		Factories in operation.	Quality of—		Gross value of cheese.	Average No. of patrons.	Milk required to make 1 lb. cheese.	Value of cheese per 100 lb.	Average date of opening.	Average date of closing.
			Milk used.	Cheese made.						
			lb.	lb.	$		lb.	$ c.		
Lake Erie	1891....	70	1,047,463	97,669	9,053	72	10.72	9 27	May 4	Nov. 2
	1890....	75	1,048,787	98,282	8,863	72	10.67	9 02	" 4	" 6
Lake Huron	1891....	49	1,080,611	101,245	9,551	82	10.67	9 43	" 17	" 1
	1890....	54	1,106,257	102,880	9,353	84	10.75	9 09	" 15	Oct. 29
Georgian Bay	1891....	20	686,049	64,701	6,000	57	10.60	9 27	" 20	" 24
	1890....	17	737,871	70,384	6,276	60	10.48	8 91	" 21	" 16
West Midland	1891....	133	1,707,829	159,411	15,075	80	10.71	9 46	April 30	Nov. 13
	1890....	136	1,621,221	151,531	13,909	74	10.70	9 18	May 1	" 8
Lake Ontario	1891....	75	869,904	81,792	7,615	54	10.64	9 31	" 3	Oct. 30
	1890....	71	819,430	77,779	6,977	51	10.54	8 97	" 4	" 28
St. Lawrence and Ottawa	1891....	374	858,129	82,223	7,625	40	10.44	9 27	" 3	" 31
	1890....	359	818,580	78,548	7,034	41	10.42	8 96	" 3	" 28
East Midland	1891....	117	934,450	89,730	8,385	44	10.41	9 34	" 1	" 31
	1890....	105	978,570	94,972	8,682	46	10.30	9 14	" 1	Nov. 1
The Province	1891....	838	1,032,761	97,767	9,137	54	10.56	9 35	" 4	" 2
	1890. .	817	1,023,730	97,142	8,800	55	10.54	9 06	" 4	Oct. 31
	1883-91.	758	946,209	90,926	8,627	54	10.41	9 49	" 4	" 29

There is a decrease of ten factories in the four western groups and an increase of 31 in the eastern section. The average cheese product per factory for the province was 625 pounds more than in 1890, but owing to increased prices the value was $337 higher than last year. The number of patrons per factory remains the same as the average for nine years. The largest factories are to be found in the West Midland group. This group shows the largest increase in business and has the longest season. The eastern groups have the advantage in the quality of the milk, though in every group except the Lake Huron it has deteriorated.

CREAMERIES. The following table gives by counties the statistics furnished by 30 public creameries, showing the quantity and value of butter made, the average number of patrons, the average price of butter per pound and the average dates of opening and closing :

Counties.	Creameries in operation.	Creameries making returns.	Butter.		Cheese.		Total value of product.	Average No. of patrons.	Average price of butter per lb.	Average date of opening.	Average date of closing.
			Quantity.	Value.	Quan.	Value.					
	No.	No.	lb.	$	lb.	$	$		cts.		
Lambton	1	1	11,160	2,382	.....	.....	2,382	17	21.34	May 18	Oct. 30
Huron	5	4	155,441	31,544	.....	.....	31,544	455	20.29	" 21	" 23
Bruce	7	6	286,625	58,534	.....	.....	58,534	808	20.42	" 17	" 30
Grey	7	6	453,798	91,699	.....	.....	91,699	1,024	20.21	" 17	Nov. 5
Perth	1	1	46,000	9,354	.....	.....	9,354	126	20.33	" 14	" 7
Wellington ...	1	1	32,000	6,560	.....	.....	6,560	110	20.50	" 26	Sept. 29
Waterloo.....	4	3	140,285	28,470	67,350	4,873	33,343	417	20.29	" 22	Nov. 9
Durham	1	1	10,500	2,041	.....	.....	2,041	56	19.44	" 30	Oct. 20
Prince Edward.	2	1	12,400	2,852	48,239	3,159	6,011	45	23.00	" 1	" 31
Leeds and Grenville....	2	2	83,274	17,962	... .	.....	17,962	62	21.57	April 12	Dec. 8
Dundas	3	2	104,533	22,323	... .	.....	22,323	99	21.36	" 21	Nov. 12
Stormont.....	1	1	48,138	10,025	83,500	4,175	14,200	46	20.83	" 29	" 30
Glengarry	1	1	18,155	3,813	.....	.....	3,813	27	21.00	May 1	Oct. 31
Other countries	3	....	....	.....	.....	.....	.....	.....	.....	.....	.....
The Province..											
1891.....	39	30	1,402,309	287,559	199,089	12,207	299,766	3,292	20.51	May 13	Nov. 4
1890.....	39	32	1,147,555	220,844	310,438	20,428	241,272	2,935	19.24	" 15	Oct. 25

The whole number of creameries reported in operation in 1891 was 39. This does not include private dairies, quite a number of which are being operated on the creamery system. The introduction of winter dairying has added an impetus to this branch of the dairy, and the season was lengthened. Creameries were organised in connection with several cheese factories for the winter season, but no results are yet to hand. Of the 30 creameries returned, 27 made butter only. The average output of these 27 was 48,844 pounds each, valued at $9,997. This average in 1890 was 38,896 pounds, and the average for the past five years was 35,620 pounds. The three combination butter and cheese factories used 2,895,217 pounds of milk, and made 83,615 pounds of butter and 199,089 pounds cheese, the total product being valued at $29,850. Six creameries gathered the milk and made butter at the rate of 24.61 pounds of milk per pound, as compared with 25.24 pounds in 1890 and 24.83 pounds for five years. The other creameries gather the cream, but only five report it by weight, and in these 4.15 pounds of cream are required to a pound of butter, while the average for four years was 4.30 pounds. The number of patrons per creamery was 110, an increase of 18 over 1890. The prices realised in 1891 show an advance of 1½ cents a pound over the previous year.

The following are the results of the three methods :

	Value of product of 100 lb. of milk. 1891.	1890.	1887-91.
Creameries (exclusive of buttermilk) ..	87.0 cents,	79.6 cents,	83.2 cents.
Butter and cheese factories.....	103.1 "	90.2 "	98.5 "
Cheese factories	88.5 "	86.0 "	90.0 "

REMARKS OF CORRESPONDENTS.

Harwich, Kent: There is very little interest taken in the dairying business in this township, as the farmers here think they can make more money by raising cattle suitable for beefing rather than for dairying, especially as our land is well adapted to grain growing, and on that account the coarse, rough feed answers for feeding young steers better than it would for milking cows. We also think we can make more money by feeding our coarse grain to hogs and selling the product as pork, instead of trying to make butter or cheese.

Aldborough, Elgin: Breeding horses seem to be overdone in this locality, and there is little or no demand for heavy or farm horses. Roadsters, carriage and hunters still keep up to a good figure. A serious mistake has been made by the farmers of this locality in breeding horses of different blood. Instead of breeding towards a fixed type of any one breed, they have crossed warm blooded mares with cold blooded stallions, or *vice versa*, until now a good mare of any breed cannot be found pure, but on the contrary the barnyards are filled with unsaleable mongrel colts which never will be available for export purposes to any country. The class of horses travelling is far inferior to what should be, and so it will be until farmers and breeders realise that merit and prepotency in a sire outweighs a few dollars difference in the service fee.

Bertie, Welland: Chesse-making is apparently an uphill business in this part of the county of Welland Two different cheese factories have started inside of the last ten years, and both have collapsed. Watering and skimming the milk has been of frequent occurrence.

Hullett, Huron: One of the leading features of our farm products is beef for the British markets, but if Canadians intend to keep the position they now occupy an improvement must be made in the quality of the animals, by first breeding from the best male animals and then taking proper care of the animals when young. They should be kept steadily growing from their birth until ready for the market. No store cattle ought to be shipped from Canada. The farmer who sells his young cattle to be fattened by some other person and sells coarse grains to fatten them is impoverishing his own soil and killing his own prospects of success.

Wawanosh, Huron: Dairy farming is one of the great branches of rural industry. Our butter has improved in quality and prfce since butter factories have become more plentiful.

Gwillimbury W., Simcoe: The dairy industry may be said to be yet in its infancy. The Travelling Dairy, under the management of Prof. Dean, has given an impetus to butter-making in the localities which he visited. His visits were highly appreciated. I have no doubt that satisfactory results will follow his lectures and practical operations. Regrets have been expressed that the Travelling Dairy was not operated in other portions of the township.

Vespra, Simcoe: Hungarian grass has been sown here this season quite extensively on account of the short hay crop, caused by the severe drouth of early summer. It has been a good crop, especially where sown on rich mellow soil.

Caistor, Lincoln: I am of opinion if farmers at present would raise less horses and more sheep they would do better by far.

Markham, York: There are too many horses in the country and not enough sheep, for sheep will live and thrive upon lands upon which horses or cattle would starve. There is always a sale for sheep, and they keep down certain weeds. Other weeds, such as burs, they compel the owner to keep down.

Hallowell, Prince Edward: The horse trade is not as good as formerly, while the shipping of hogs has largely increased.

Storrington, Frontenac: There is a great change in the condition of farmers in this section in the last five or six years, as nearly all have gone extensively into dairying. They keep as many cows as they can feed well. They have improved their stables and are improving their cows. A good many sheep are also raised, which bring good prices, and as nearly all the produce of the farm is fed on the farm the land is improved, thereby improving the means of the farmer.

Lancaster, Glengarry: A few have raised calves this year on oil cake and shorts, and sent the milk to the factory. I raised twenty in that manner this season, and a neighbor raised forty in a similar way, and he is well pleased with the experiment.

Gower N. Carleton: I think the Travelling Dairy was a great benefit to the farming community, as the newspapers gave a good account of the proceedings.

THE APIARY.

In the bulletin issued in November, 1890, a fear was expressed that owing to the fall being too wet and cold for the gathering of a full supply of nectar by bees, unskilled apiarists would find themselves entering the winter with empty stores and weak colonies, which meant feeding back and doubling up or annihilation. The reports in the spring of 1891 confirmed the correctness of the opinion then expressed, as heavy losses were reported among bees, ranging all the way from 5 to 75 per cent., the cause of which was chiefly attributed to lack of stores. One apiarist of long experience reported 50 per cent. gone, and another well-known bee-keeper put his own loss at 25 per cent., while a few others

rejoiced in almost complete immunity from loss. Not more than three or four correspondents reported foul brood, and two or three spoke of dwindling, but nearly all the rest emphatically stated that bees were free from disease.

The August bulletin thus referred to the apiary: "The past season has not been a particularly favorable one for bees. A scarcity of nectar in the early summer and a consequent lack of food for brood rearing retarded swarming very materially. As a general rule swarming was not nearly so frequent as usual. There has not been an abundant supply of nectar from any source, and the yield of honey is not likely to average more than between thirty and forty pounds per hive, although the season is not yet over. Foul brood is said to be on the increase in Perth, but very little disease is reported on the whole, and bees are now in good condition."

According to the November bulletin correspondents had not much to say regarding bees and honey. "Apiaries in the central and eastern sections of the province appear to have done better than those in the west. In Essex some bee-keepers were already beginning to feed back owing to shortness of stores, but in Halton one apiarist was said to have got 125 pounds of extracted honey per hive. Taking the province as a whole, however, it is doubtful whether the average yield will go over 35 pounds. Much of the honey is described as rather dark in color. Foul brood was complained of in only a few localities in the west. It is gratifying to know that this dread plague of the apiary is being overcome."

FACTORIES AND CREAMERIES IN ONTARIO.

CHEESE FACTORIES IN OPERATION IN ONTARIO DURING 1891, WITH NAME AND POST OFFICE ADDRESS OF THE SECRETARY OF EACH FACTORY.

NOTE.—No return received from factory marked with asterisk (*).

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
ESSEX :			
Mersea	Blytheswood	W. W. Ames, Sec.	Blytheswood.
KENT :			
Camden	*Dawn Mills	J. T. Race, Prop	Dawn Mills.
Chatham	Chatham Gore	David McArthur, Pres.	Tupperville.
	Sydenham Valley	J. N. McCoy, Sec.	Wallaceburg.
Harwich	*Creek Road	John Buller	Harwich.
Orford	Orford Cheese Mfg Co.	S. McDonald, Sec	Muirkirk.
	*Grant's	Samuel Grant, Prop	Turin.
Raleigh	*Scaman's	Wm. S. Scaman	Charing Cross.
	*Smith Bros	Wm. Smith, Sec.	do
Tilbury East	Valetta	John Richardson	Valetta.
ELGIN :			
Aldborough	*Crinan	W. H. McLean	Crinan.
	*Rodney	Wm. Johnston, Mfr	Rodney.
	*Rosedale	H. Terry, Prop.	Aldborough.
	West Lorne	John F. Taylor, Sec.	West Lorne.
Bayham	Bayham	E. T. Martin, Sec.	Griffin's Corners.
	Bayham Br. (Brownsville)	Benj. Hopkins, Salesman	Brownsville.
	*Bayham and Malahide	John L. Brown, Sec.	Corinth.
	New England	O. E. Twiss, Sec.	Tilsonburg.
	Nova Scotia St	J. E. Chute, Pres.	Lakeview.
	Guysborough	J. P. Soper, Prop.	Guysborough.
	Vienna	J. T. Gamble, Sec.	Vienna.
Dorchester S	Avon	Duncan Campbell, Sec.	Avon.
	Lyons	Thos. Wilkinson, Sec.	Lyons.
	Springfield	John Clunas, Sec.	Springfield.
Dunwich	Dutton	W. A. Ostrander, Prop	Dutton. Box 217.
	Wallacetown	A. Keilor, Prop.	Wallacetown.
Malahide	Dunboyne	Noble F. Tufford, Sec.	Dunboyne.
	Malahide	R. Abel, Sec.	Seville.
	Northwood	George Beckett, Sec.	Aylmer.
Southwold	Iona Station	C. A. Ostrander, Prop.	Iona Station.
	Payne's Mills	Wm. Sharon, Sec.	Frome.
	West Magdala	R. R. Cranston, Prop.	West Magdala.
Yarmouth	Elgin	J. W. Scott, Prop.	Sparta.
	*Mapleton	A. Charlton	Mapleton.
	Yarmouth Centre	James Brown, Sec.	YarmouthCentre.
NORFOLK :			
Charlotteville	St. Williams	G. W. Newman, Sec.	St. Williams.
	Vittoria	John Pow, Sec.	Vittoria,
	Walsh	Walter Rollings, Sec.	Walsh.
Houghton	Clear Creek	E. G. Matthews, Prop.	Clear Creek
	Houghton Centre	S. T. Jackson, Prop.	Houghton.
Middleton	Courtland	O. E. Twiss, Sec.	Tilsonburg.
	Delhi	G. R. Gray, Sec.	Delhi. Box 115.
Townsend	Bloomsburg	J. H. Lingwood, Sec.	Bloomsburg.
	Boston	H. J. Barber, Pres.	Boston.
	*Rockford, *Villa Nova	H. W. Foster, Sec.	Villa Nova.
	Waterford	John Martin, Prop.	Waterford.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
NORFOLK—*Con.*			
Walsingham	Carholme	Wm. Knowles, Pres	Carholme.
	Lynedoch	G. R. Gray, Prop	Lynedoch.
	Marston	C. H. Brayley, Sec	Marston.
Windham	Bookton	Norman McCurdy, Sec	Bookton.
	Nixon	W. S. Wood, Treas	Nixon.
	Ranelagh	James Walker, Treas	Ranelagh.
	*Vanessa	W. J. Reavely	Vanessa.
Woodhouse	Black Creek	W. C. Parsons, Prop	Jarvis.
	Excelsior	W. H. Olds, Sec	Simcoe.
	Lynn Valley	E. G. Ford, Prop	Lynn Valley.
HALDIMAND:			
Canborough	Attercliffe Sta	Harold Eagle, Sec	Attercliffe Sta.
	Canborough	James N. Paget, Prop	Canborough.
Cayuga N	*Kohler	W. H. Kindree, Sec	Decewsville.
Dunn	Lake View	F. Splatt, Prop	Dunnville.
Rainham	Selkirk	Joel Hoover, Sec	Selkirk.
Seneca	Tyneside	J. M. Clysdale, Prop	Tyneside.
Walpole	*Cheapside	R. A. Walter, Sec	Cheapside.
	Jarvis West	W. C. Parsons, Prop	Jarvis.
	Springvale	W. Hainer, Prop	Springvale.
	*Walpole	John W. Bain, Prop	Cheapside.
WELLAND:			
Wainfleet	Forks Road	John G. Wills, Sec	Winger.
	Johnson's	James Johnson, Sec	Wellandport.
Willoughby	*Beam's	Joshua F. Beam, Prop	Black Creek.
LAMBTON:			
Bosanquet	Ridge Tree	Alex. Jamieson, Sec	Thedford.
Brooke	*Aberfeldy	John J. Risk, Prop	Aberfeldy.
	*Brooke and Warwick	Alex. Cowan, Sec	Watford.
	Walnut	W. G. Willoughby, Prop	Walnut.
Plympton	Forest	Wm. Lougheed, Sec	Forest.
	Gala Bank	Wm. Symington, Prop	Camlachie.
	South Plympton	A. D. Anderson, Sec	Wyoming.
	Uttoxeter	Edward Archer, Sec	Warwick West.
Sarnia	Vyner	Miles Carrick, Sec	Mandaumin.
Sombra	Sombra Cheese Co	W. S. Howell, Sec	Thornyhurst.
Warwick	Maple Grove	B. Batchelor, Sec	Birnam.
	Thompson	Wm. Thompson, Sec	Arkona.
	Warwick	J. S. Clarke, Prop	Warwick West.
HURON:			
Grey	Ethel	Robert Barr, jr., Prop	Ethel.
	Grey and Morris	Daniel Stewart, Sec	Brussels.
	Molesworth	Henry Coghlin, Sec	Molesworth.
	Walton	R. H. Ferguson, Sec	Walton.
Howick	Fordwich	James Fallis, Sec	Newbridge.
	Peoples	Wm. McKercher, Sec	Wroxeter.
	Springbank	George Padfield, Sec	Gorrie.
Hullett	Constance	R. Jamieson, Sec	Seaforth.
McKillop	Winthrop	John C. Morrison, Sec	Winthrop.
Stanley	*Blake	Asa J. Styles, Sec	Blake.
Stephen	Centralia	C. Smith, Mfr	Centralia.
Tuckersmith	Rodgerville	James Murray, Sec	Rodgerville.
Turnbury	Bluevale	John Burgess, Sec	Bluevale.
Wawanosh E.	Belgrave	George Hood, Sec	Sunshine.
BRUCE:			
Amabel	Wiarton	Geo. H. Johnson, Sec	Wiarton.
Arran	Tara	John Douglas, Sec	Tara.
Brant	Brant	Daniel Sullivan, Sec	Malcolm.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
BRUCE—*Con.*			
Brant	Dunkeld	Thos. A. Chisholm, Sec	Dunkeld.
Bruce	Climax	Andrew Kirkconnell, Pres	Tiverton.
	Underwood	Amos Hilker, Sec	Underwood.
Carrick	Belmore	John Hartley, Sec	Belmore.
	Otter Creek	Louis Braun, Sec	Walkerton.
Elderslie	Elderslie	Isaac McClure, Sec	Williscroft.
	Pinkerton	Frank Millson, Sec	Pinkerton.
Greenock	Riversdale	Wm. Waddell, Sec	Kinloss.
Huron	Huron	Adam Ruttle, Pres	Ripley.
	Paramount	Henry Hudson, Sec	Lucknow.
	Pine River	John Thompson, jr., Dir	Pine River.
	Ripley	H. W. Farnell, Sec	Ripley.
Kincardine	Armow	F. Matheson, Sec	Armow.
	Bervie	James Glass, Sec	Kinloss.
	Glammis	W. M. Atton, Sec	Tiverton.
	Millarton	Wm. Rutledge Pres	Millarton.
Kinloss	Lucknow	J. A. Denning, Sec	Lucknow.
Saugeen	Burgoyne	T. B. Millar, Salesman	Burgoyne.
	Star	John Muir, Sec	Port Elgin.
GREY :			
Artemesia	Flesherton	James Brodie, Sec	Vandeleur.
	Markdale	Henry D. Irwin, Sec	Markdale.
Egremont	Boothville	George Watson, Sec	Swinton Park.
Holland	Chatsworth	W. A. Ferguson, Sec	Chatsworth.
Normanby	Alsfeldt, Ch. & B. Co	C. H. Peterson, Sec	Clifford.
	Mount Forest	Joseph Tuck, Sec	Mount Forest.
	Varney	Chas. Ramage, Sec	Varney.
Osprey	Badjeros	George Bailey, Treas	Shrigley.
Proton	Dundalk	Robert Russell, Sec	Dundalk.
	Ventry	James Cavanagh, Sec	Ventry.
	Victoria	Wm. Haines, Prop	Inistioge.
SIMCOE :			
Flos	Elmvale	Wm. Harvey, Sec	Elmvale.
Nottawasaga	Avening	W. G. Carruthers, Sec	Avening.
	Glen Huron	James Connor, Sec	Glen Huron.
	Lavender	Samuel Flach, Prop	Lavender.
	Stayner	W. B. Sanders, Sec	Stayner.
Orillia	Northbrooke	Arch Fyfe, Sec	Orillia.
Tecumseth	Cookstown	W. F. Moore, Sec	Cookstown.
Tiny	*Lafontaine	Lecamp & Tremeer, Dirs	Randolph.
	Wyebridge	John Adams, Sec	Wyebridge.
MIDDLESEX :			
Adelaide	Kerwood	H. P. Richardson, Prop	Kerwood.
	Mud Creek	R. J Coulton, Sec	Springbank.
	Keyser	Hugh E. Wilson, Sec	Keyser.
	*Victoria	Wm. Dowding	Adelaide.
Biddulph	Cedar Vale	Michael Blake, Sec	Elginfield.
	North Middlesex	George W. Fox, Sec	Lucan.
Caradoc	Caradoc	Wm. E. Sawyer, Sec	Mount Brydges.
	Mount Carmel	D. Leitch, Sec	Strathroy.
	Muncey Road	John Stuart, Sec	Burwell Road.
Delaware	Delaware	H. J. Smith, Sec	Lambeth.
Dorchester N	Burnside	S. Barr, Sec	Mossley.
	*Dorchester Station	L. D. Monk	Dorchester Sta.
	Gladstone	W. H. Swales, Sec	Gladstone.
	Gore	George A. Myers	Crampton.
	Harrietsville	F. Kunz, Sec	Harrietsville.
	Thames	J. A. James, Mfr	Nilestown.
Ekfrid	Appin	Hector McFarlane, Sec	Glencoe.
	*Mayfair	John Cooper, Sec	Melbourne.
London	*Birr	C. W. Walden, Sec	Birr.
	*Bryanston, *Devizes	Robert Elliott, Sec	Plover Mills.
	Geary	John Geary, Prop	London, Box 132.
	Melrose	John Ferguson	Ferguson.
	North Branch	Fred Bailey, Sec	Rebecca.
	Proof Line	James Tier, Sec	Arva.
	Union Hill	R. H. Harding, Sec	Thorndale.
Metcalfe	Napier	Wm. Ormerod, Mfr	Napier.
	Sifton's	Thos. H. Payne, Sec	Cairngorm.
Mosa	Glencoe	Hector McFarlane, Sec	Glencoe.
Nissouri W	Blanshard and Nissouri	Fergus McMaster, Sec	St. Marys.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
MIDDLESEX —*Con.*			
Nissouri W	Cherry Hill	Hope Webster, Sec	Thamesford.
	Nissouri West	W. Lee, Sec	Thorndale.
Westminster	Belmont	George McKellar, Sec	Belmont.
	*Glanworth	R. G. Rose, Sec	Hubrey.
	North Street	H. B. Stephens, Prop	Lambeth.
	Pond Mills	Andrew Elliot, Sec	Pond Mills.
	Westminster	A. E. Carrothers, Sec	Hubrey.
	White Oak	John H. Burnard, Sec	Littlewood.
Williams W	Rob Roy	Wm. Dickson, Sec	Parkhill.
OXFORD :			
Blandford	Bright	John Riesberry, Pres	Bright.
	Eastwood	W. E. Hopkins, Sec	Eastwood.
Blenheim	Soho Ch. & B. Co	J. E. Pounds, Sec	Richwood.
Dereham	Brownsville, Culloden, Tilsonburg	Ben amin Ho kins, Salesman.	Brownsville.
	Dereham and Norwich	Wm. Jones, Sec	Mount Elgin.
	Dereham and W. Oxford	A. R. McNiven, Sec	Ingersoll.
	Lawson's	J. P. Harris, Salesman	Holbrook.
	Mount Elgin	Wm Pow, Sec	Mount Elgin.
	*Prouse's	Thos. Prouse, Prop	do
	Salford	T. L. Newton, Sec	Salford.
	Verschoyle	James Hunter, Sec	Verschoyle.
	*Wilkinson's	J. H. Wilkinson	do
Nissouri E	Kintore	J. W. Sutherland, Sec	Medina.
	Kintore (East branch)	Thos. W. Alderson, Sec	Kintore.
	Lakeside	Robert Marshall, Pres	Lakeside.
	Murray Bros	Wm. McLaren, Sec	St. Marys.
	*Nissouri	G. A. Sutherland, Sec	Ingersoll.
	Thamesford	David Lawrence, Sec	Thamesford.
Norwich N	Dunkin's	T. L. Dunkin, Sec	Norwich.
	*Ontario, Burgesville	I. L. Farrington, Prop	do
	Smith's	Job Smith, Pres	do
Norwich S	Springford	F. C. Anstice, Sec	Springford.
	Summerville	G. H. Treffey, Sec	Hawtrey.
Oxford E	Diamond	J. McConnell, Sec	Vandecar.
	*Oxford	I. L. Farrington, Prop	Norwich.
	Oxford East and West	M. S. Schell, Sec	Woodstock.
Oxford N	Maple Leaf	Thos. Caddey, Prop	Ingersoll.
	Oxford, North	W. H. Sutherland, Sec	do (Box 111).
Oxford W	*Harris Street	C. E. Cook	do
	Oxford, West	W. G. Francis, Sec	do
	Anderson's	Douglas Bruce, Sec	South Zorra.
Zorra E	Blandford and Zorra E	A. Miller, Sec	Walmer.
	German Union	P. J. Altemann, Sec	New Hamburg.
	Honey Grove	Robert Morton, Prop	Cassel.
	Spring Creek	A. McKay, Sec	Woodstock.
	Strathallan	Alex. King, Sec	Hickson.
Zorra W	Brooksdale	John Forbes, Sec	Maplewood.
	Cold Springs	Hugh Matheson, Sec.	Youngsville.
	Red Star	W. H. Sutherland, Sec	Ingersoll.
	Zorra, West	Wm. Loveys, Pres	Embro.
BRANT :			
Brantford	N. Brant Dairy Ass	Thos. A. Good, Sec	Brantford.
Burford	Cathcart	Chas. Kelly, Sec	Cathcart.
	*Harley	I. L. Farrington, Prop	Norwich.
	*Kelvin	Joseph McCombs, Sec	Kelvin.
	New Durham	James Paterson, Sec	New Durham.
Dumfries S	*St. George	John Richardson, Prop	St. George.
Oakland	Oakland	George Taylor, Sec	Oakland.
PERTH :			
Blanshard	Blanshard	George B. Webster, Sec	St. Marys.
Downie	Avonbank	Wm. Tier, Sec	Motherwell.
	Black Creek	Thos. Ballantyne, M.P.P	Stratford.
	Downie	H. A. Southwick, Prop	Avonton.
	Gore of Downie	John Dempsey, Prop	Fairview.
	Kastnerville	Geo. Barthel, Pres	Stratford.
Easthope N	Avondale	R. M. Ballantyne, Prop	do

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
PERTH—*Con.*			
Easthope S	Tavistock	A. T. Bell, Sec	Tavistock.
Ellice	Classic	D. A. Dempsey, Sec	Stratford.
	Ellice	Chas. Stock, Sec	Stratford.
Elma	*Britton	Wm. Stevenson	Britton.
	Donegal	Samuel McAllister, Prop	Donegal.
	Elma	Wm. Lochhead, Sec	Atwood.
	Elmbank	Robert Cleland, Prop	Listowel
	Gotham	Joseph Freeman, Sec	Britton.
	Monkton	Andrew Erskine, Sec	Monkton.
	Newry	John Morrison, Sec	Newry.
	Silver Corners	Geo. Richmond, Sec	do.
	Trowbridge	John Adams, Sec	Trowbridge.
Fullarton	Cold Creek	Thomas Stacey, Sec	Fullarton.
Logan	Willow Grove	Wm. Pomeroy, Prop	Mitchell.
Mornington	Milverton	G. E. Goodhand, Prop	Milverton.
	Newton, Carthage	Hugh Jack, Sec	Newton.
Wallace	Cedar Grove	George V. Pool, Sec	Wallace.
	Wallace	Jeptha Vankleeck, Sec	Listowel.
WELLINGTON:			
Arthur	Conn	James McLuhan, Sec	Conn.
	Kenilworth	George Cushing, Sec	Kenilworth.
Luthur W	Arthur and Luther	John McNab, Sec	Arthur.
Maryborough	Maryborough	Wm. Wilson, Sec	Rothsay.
	*Riverbank	A. R. McLachlan, Sec	do.
	Wyandotte	Thos. J. Paterson, Sec	Moorefield.
Minto	Harriston	W. D. McLellan, Sec	Harriston.
	Minto and Arthur	James Wiseman, Sec	Cotswold.
	*Palmerston	John Cooper, Sec	Palmerston.
Peel	Goldstone	W. T. Whale, Sec	Goldstone.
	Peel	John Hought, Sec	Glenallan.
WATERLOO:			
Dumfries N	Galt	W P. Clay, Prop	Galt.
Wellesley	Bamberg	Jacob Kaufman, Sec	Bamberg.
	Honey Grove	J. W. Chambers, Prop	Poole.
Wilmot	Oak Grove	George Cousins, Mfr	New Hamburg.
	Philipsburg	John D. Schantz, Prop	Baden.
DUFFERIN:			
Amaranth	Laurel	Jonathan Varcoe, Sec	Laurel.
Melancthon	Shelburne	Jacob Walker, Treas	Shelburne.
LINCOLN:			
Caistor	Caistorville	J. T. Taylor, Sec	Caistorville.
Clinton	*Beamsville	Arthur Hunter	Beamsville.
Gainsborough	Bismarck	John L. Heaslip, Sec	Wellandport
WENTWORTH:			
Ancaster	Renforth	D. Hamilton, Sec	Renforth.
Beverley	Beverley	George Paterson, Prop	West Flamboro.
	Sheffield	P. H. Green, Salesman	Sheffield.
PEEL:			
Chinguacousy	Norval	Robert Groat, Prop	Georgetown.
YORK:			
King	Eversley	Henry Rogers, Sec	Eversley.
Markham	Cedar Grove	Mrs. J. N. Raymer, Mfr	Box Grove.
	*Ringwood	A. B. Grove	Ringwood.
ONTARIO:			
Whitby E	Geneva	James Burns, Mfr	Columbus.
DURHAM:			
Cavan	Ida	Wm. H. Lough, Sec	Ida.
	Fraserville	Joseph Madill, Sec	Fraserville.
	Mt. Pleasant	G. A. Jamieson, Sec	Mt. Pleasant.
	Millbrook	James Brock, Sec	Millbrook.
Clarke	Newtonville	W. J. Jones, Sec	Clarke.
	Orono	James Hunter, Sec	Orono.
Darlington	Darlington	L. M. Courtice, Salesman	Courtice.
	Hampton	F. L. Ellis, Sec	Hampton.
Hope	Hope	Wm. Henwood, Sec	Welcome.
	Perrytown	Fred. Currelley, Sec	Canton.
Manvers	Fleetwood	James Dean, Sec	Lifford.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
NORTHUMBERLAND:			
Alnwick	Roseneath	Dennis Keogan, Sec	Hastings.
Brighton	Brighton and Murray	Isaac W. Hennessey, Sec	Wooler.
	*Cedar Hill	Hugh Strong, Prop	Hilton.
	Codrington	A. D. Richards, Pres	Codrington.
	Hilton	A. E. Thorne, Sec	Hilton.
	Standard	John Armstrong, Pres	Warkworth.
Cramahe	Castleton	R. R. Philp, Pres	Port Hope.
	Cramahe	R. A. Brintnall, Treas	Dundonald.
	*Morganston	Homer Platt, Sec	Morganston.
	Salem	S. E. Dixon, Sec	Colborne.
Haldimand	Glenco	Thos. Hoskin, Sec	Grafton.
	Spring Valley	A. G. McDonald, Prop	Burnley.
	Wicklow	R. J. Rutherford, Sec	Wicklow.
Hamilton	Baltimore, Crown	Samuel Philp, Prop	Baltimore.
	North Star	John Kent, Pres	Plainville.
Monaghan S	Bensfort	John Riddell, Sec	Bensfort.
Murray	Fountain	Sheldon Moran, Pres	Frankford.
	*Maple Leaf, B	C. W. Wright, Sec	do.
	Queen's	W. A. Hendrick, Pres	do.
	Smithfield	W. H. Potts, Sec	Smithfield.
Percy	Brickley	A. B. German, Sec	Brickley.
	Model	Douglas Kingsberry, Sec	Hastings.
	Warkworth	T. B. Carlaw, Pres	Warkworth.
Seymour	Brae	Gilbert Bedford, Sec	Campbellford.
	Crow Bay	James C. Cleugh, Pres	Sarginson.
	Empire	Robert White, Pres	Campbellford.
	Forest	Alex. Haig, Sec	Menie.
	I. X. L	Thos. Rutherford, Sec	Campbellford.
	Meyersburg	Wm. Clark, Pres	Meyersburg.
	Prince of Wales, Valley	John Clark, Sec	Campbellford.
	Rylestone	Arch. Morton, Pres	Springbrook.
	Seymour West	E. C. West, Sec	Campbellford.
	Stanwood	James B. Peoples, Sec	Prenevoau.
	Woodland	F. Macoun, Pres	Campbellford.
PRINCE EDWARD:			
Ameliasburg	Brandy Creek	R. N. Hunt, Pres	Murray.
	Mountain View	A. J. Potter, Sec	Mountain View.
	Quinte	E. Babbitt, Pres	Rednerville.
Athol	Cherry Valley	Luther Platt, Sec	Cherry Valley.
Hallowell	Bloomfield	David S. Hubbs, Sec	Bloomfield.
Hillier	Cloverdale	L. G. Dorland, Sec	Wellington.
Marysburg N	Lake View	G. N. Rose, Sec	Waupoos.
	Union	Robert Davison, Sec	Picton.
Marysburg S	Black Creek	Wm. Call, Sec	Milford.
	Point Traverse	Alva Rose, Sec	South Bay.
	Royal Street	W. T. B. Striker, Prop	Milford.
Sophiasburg	*Ben Gill, *Elm Brook	Richard Benson	Picton.
	*Big Island	Ryerson Rankin, Sec	Demorestville.
	Grape Vale	J. F. Roblin, Prop	Fish Lake.
	Maple Leaf	Alfred Foster, Sec	do.
	Northport	Ira David, Pres	Solmesville.
LENNOX AND ADDINGTON:			
Adolphustown	Platt's	Thos. F. Gibbs, Jr., Sec	Adolphustown.
Camden	Camden East	George E. Hinch, Sec	Camden East.
	Centreville, Croydon	Wm. Whelan, Prop	Centreville.
	Enterprise, Whitman Creek	Thomas Clancy, Prop	Enterprise.
	Moscow	Vanluven Bros., Props	Moscow.
	Newburgh	George A. Aylesworth, Sec	Newburgh.
Ernestown	Bath, Union	W. R. Gordanier, Sec	Morven.
	Empey	M. N. Empey, Sec	Napanee.
	Metzler	L. L. Gallagher, Sec	Wilton.
	Odessa	James C. Fraser, Sec	Odessa.
	Excelsior	E. H. Sills, Salesman	Napanee.
Fredericksburg N	Napanee	W. N. Dollar, Sec	do.
	*Phœnix	Charles B. Parks, Sec	Hay Bay.
Fredericksburg S	Conway	Wm. Phippen, Prop	Sandhurst.
	Sillsville	James Rennie, Salesman	Sillsville.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
LENNOX AND ADD.—*Con.*			
Kaladar	Flinton	Thomas Welsh, Mfr	Flinton.
Richmond	Forest Mills	J. J. Doyle, Sec	Kingsford.
	Selby	Ira B. Hudgins, Sec	Selby.
Sheffield	Clarview	John Garret, Sec	Erinsville.
	Sheffield	D. E. Rose, Sec	Tamworth.
	Tamworth	J. J. Barry, Sec	do
FRONTENAC:			
Bedford	Fermoy, Salem	John McGuire, Sec	Westport.
	Tichborne	Joseph Kenny, Prop	Tichborne.
Hinchinbrooke	Iron Junction	Joseph Kennedy, Sec	Godfrey.
	*Parham	W. Black, Sec	Parham.
Howe Island	Thousand Island	F. J. Henderson, Pres	Pittsferry
Kingston	*Arigan	Patrick Black, Sec	Mt. Chesney.
	*Glenburnie	Joseph Fowler, Treas	do
	Glenvale	J. Watts, Sec	Glenvale.
	Lake Shore	H. E. Wartman, Pres	Portsmouth.
	Union	Joshua Knight, Sec	Elginburg.
Loughborough	Forest	John Moreland, Sec	Sydenham.
	*Railton	Keely & McAuley	Railton.
	Perth Road	Walter Guthrie, Sec	Perth Road.
Pittsburg	Central	Thos. Anglin, Sec	Atkinson.
	Granite Hill	F. J. Henderson, Sec	Pittsferry.
	Keenan & Sons	T. A. Keenan, Sec	Mt. Chesney.
	Leo Lake	John P. Bower, Pres	Seeley's Bay, Box
	*Maple Leaf	Thomas Bell	Joyceville. [131.
	Morning Star	Daniel McLean, Prop	Eric.
	Pine Grove	Peter McCallum, Sec	Brewer's Mills.
	Pine Hill	David Trotter, Sec	Cushendall.
	Rose Hill	James Lane, Prop	Dufferin.
	Woodburn	David Rae, Salesman	Willetsholme.
Portland	Bellrock, Hartington	Vanluven Bros., Props	Moscow.
	*Verona	Howard Reynolds, Prop	Verona.
Storrington	*Battersea	W. J. Anglin	Battersea.
	Bear Creek	N. Jackson, Sec	Sunbury.
	Cold Springs	C. W. Langwith, Sec	Sunbury.
	Duff's	Alexander Ritchie, Sec	Inverary.
	Excelsior	Mrs. G. E. Clark, Sec	Battersea.
	*Lake Opinicon	Adam Barr	Inverary.
	Sand Hill	W. W. Sands, Sec	Sunbury.
	*Storrington	L. W. Murphy	Brewer's Mills.
	*Sunbury	Gordon Waldron, Sec	Sunbury.
	*Washburn	Henry McBroom	Washburn.
Wolfe Island	St. Lawrence	Rattray & Kenny, Props	Wolfe Island.
LEEDS AND GRENVILLE:			
Augusta	Charleville, Grenville, Domville, Glenmore	J. W. Place, Sec	Prescott.
	Maple Grove	F. K. Wright, Sec	Algonquin.
	*North Augusta	George Neeley	North Augusta.
	Roebuck	James Keating, Sec	Lansdowne.
	Riverview	John McLean	Maitland.
	South Branch, South Valley	Frank Meech, Sec	North Augusta.
	Willow	Andrew McNish, Sec	Brockville.
Bastard and Burgess S.	*Clear Spring	Alex. Murphy, Sec	Portland.
	Delta Lake	John W. Russell, Sec	Delta.
	Grand Central	E Bowser, Treas	do
	*Myers'	Thomas Myers, Prop	Forfar.
	People's Mutual	Thos. G. Morris	do
	Philipsville	L. N. Phelps, Sec	Philipsville.
	Plum Hollow	Andrew Derbyshire, Sec	Chantry.
	*Poole's	Wm. N. Poole, Mfr	Freeland.
	Reliable	Rogers & Co., Prop	Newboyne.
	Smith's Valley	R. A. Sheldon, Sec	Harlem.
Crosby N.	Ardmore, Westport	John McGuire, Sec	Westport.
	Centreville, *Model	T. C. Singleton, Prop	Newboro'.
Crosby S.	Clear Lake Union	George Leggett, Treas	Singleton.
	*Dominion	E. V. Halladay, Prop	Elgin.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
LEEDS AND GREN.—*Con.*			
Crosby S.	Maple Grove	S. M. Halladay, Mfr.	Elgin.
	Morton	R. H. Somerville, Pres.	Morton.
	Rockdale, Elgin Model	J. R. Dargavel, Sec.	Elgin.
	Singleton	T. C Singleton, Prop	Newboro'.
Edwardsburg	Glensmail, (Eager's)	R. J. Bennett, Sec.	Glensmail.
	Johnstown, (Eager's)	L. Rooney, Sec	Prescott.
	Liezert's Nos. 1 and 2	J. T. Liezert, Sec.	Pittston.
	Lime Kiln	Wm. Gore, Sec	Prescott.
	Mainsville	William Eagar, Prop.	Morrisburg.
	Millar's, Nos. 1, 2 and 3	Millar & Ferguson, Props.	Spencerville.
	Shanley, (Eager's)	George Anderson, Sec.	Shanley.
	Perry Creek	A. D. VanCamp, Salesman.	Prescott.
Elizabethtown	*Anvern	A. C. Johns, Prop.	Fairfield, East.
	Barlow	C. L. McCready, Sec.	Addison.
	*Excelsior	R. McNish	Brockville.
	Glen Buell	C. J. Gilroy, Sec.	Glen Buell.
	Kilborn Springs	W. Billings, Sec.	Lyn.
	*Leeds Union	L. Shipman, Sec.	do
	Maple Grange	Joshua Gilroy, Sec.	do
	North Star	C. M. Taylor	do
	Orchard Valley	J. C. Winckworth, Sec.	Jellyby.
	Palace	Cyrenus Stowell, Pres.	Addison.
	*Rockspring	W. C. Tackabery	Rockspring.
	Royal Dominion	T. W. Horton	New Dublin.
	*Smith's	Thomas Smith	Greenbush.
Elmsley S.	*Lombardy	Michael O'Mara	Lombardy.
Gower S.	Heckston	Wm. Eager, Prop.	Morrisburg.
Kitley	*Farmer's Choice	Fred. W. Scovill	Athens.
	Farmer's Friend	Charles R Rudd, Sec.	Frankville.
	Glen Elm	Hugh A. Hunter, Sec.	Smith's Falls.
	Newbliss	John MacKay, Sec.	Newbliss.
	Robinson	Alex. Cameron, Sec.	Smith's Falls.
	Silver Creek	Geo. S. Stratton, Sec.	Toledo.
Leeds and Lansdowne.	Bay	Robert Wilson, Sec	Wilstead.
	Birmingham's Cheddar	James Birmingham, Sec.	Gananoque.
	Bruce, Fairfax	James Keating, Sec.	Lansdowne.
	Cold Glen	J. Willoughby, Prop.	Ellisville.
	Deerlick	John Cowan, Sec	Lansdowne.
	Dulcemain	Wm. Sliter, Sec.	Warburton.
	Gananoque	Wm. Richardson, Sec.	Gananoque.
	Gananoque Junction	John Connor, Pres.	do
	Lake View, Lyndhurst	James Berney, Sec.	Lyndhurst.
	Lorne	James Donevan, Sec.	Gananoque.
	*Mountain View	James Nobes, Sec.	do
	Oak Leaf	M. J. Johnson, Treas	Oak Leaf
	Peoples'.	H. McAlpin, Treas.	South Lake.
	*Rapid Valley	C. A. Bradley	Lansdowne.
	St. Lawrence	George E. Godkin, Prop	Waterton.
	Sand Bay	Benj. Herbison, Sec	Sand Bay.
	Seeley's Bay	R. Gardiner, Prop.	Seeley's Bay.
	Springvale	H. F. Metcalfe, Sec.	Morton.
	Tilley	James W. Grier, Sec.	Lansdowne.
	Warburton	John Cook, Sec.	Warburton.
	Washburn	L. H. Washburn, Salesman.	Soperton.
Oxford on Rideau	Anderson's	John Anderson, Prop.	Oxford Mills.
	*Bishop's Mills	Albert Alexander, Sec	Bishop's Mills.
	Maple Ridge (Eager's)	W. A. Scott, Sec.	Kemptville.
	Graham	H. D. Graham, Sec.	Millar's Corners.
	*Kemptville	Orlando Bush, Sec.	Kemptville.
	*Oxford Mills	Levi Patton, Sec.	Oxford Mills.
Wolford	Old Fairfield	Rufus Bissell, Sec.	Easton's Corners.
	Rideau Valley	John Kerr, Sec.	Merrickville.
Yonge and Escott	Caintown Union	W. J. White. Sec	Caintown.
	Elbe	Bates & Brown, Props.	Elbe Mills.
	*Escott Union	W. H. Warren, Sec.	Rockfield.
	Farmersville	L. A. Green, Sec.	Athens.
	Holland	H. C. Lynch, Sec.	Escott.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
LEEDS AND GREN.—*Con.*			
Yonge and Escott....	Junetown, A.....	Jacob Herbison, Salesman...	Caintown.
	Junetown, B.....	Alvin Avery, Sec	do
	Leeder's	Robert Hogan, Sec	do
	Leeds County	Terrence Purvis, Sec.....	Young Mills.
	Lillie Springs..	R. W. Littlejohn, Pres.....	Caintown
	Mallory's.....	A. W. Mallory, Prop.....	Mallorytown.
	Mallorytown Union.....	David Forester, Sec.....	do
	Ronan's	Mathew Ronan, Prop.....	Athens. Box 154.
	Springfield Union	N. Hutcheson, Sec.	Escott.
DUNDAS:			
Matilda.....	Advance, No. 2.....	Thomas Scott, Salesman	Glen Stewart.
	Advance No. 3.....	S. W. Wood, Sec..... ..	Dixon's Corners.
	Dundela, Rowena.....	Wm. Eager, Prop.....	Morrisburg.
	Farmer's	G. A. Burnside, Sec.....	Iroquois.
	Iroquois (Eager's).....	F. W. Hare, Sec.....	do
	Maple Grove.....	Angus Houlahan, Sec.....	Brinston's Corn's.
	Model, No. 1.....	E. A. Roode, Prop.....	Hulbert.
	Morrisburg	C. E. Robertson, Sec.....	Morrisburg.
	*Thompson's No. 6.....	W. H. Thompson, Prop.....	Prescott.
Mountain	*Advance, No. 1.....	Edward Scott, Prop.....	Heckston.
	Rose & Co., Nos. 1 and 3..	John McTavish, Sec.....	Van Camp.
	South Mountain, Inkerman.	Wm. Eager, Prop	Morrisburg.
Williamsburg	Archer.....	G. C. Tracy, Sec.....	Archer.
	Caughnawaga	Wm. Eager, Prop.	Morrisburg.
	Denison	Reuben Prunner, Sec.....	Archer.
	Dunbar.....	Isaiah Barkley, Sec.....	Dunbar.
	*Elma, *Colquhoun	John N. Logan.....	Elma.
	Glen Becker.	Wm. Eager, Prop	Morrisburg.
	Hoasic	Chas. L. Baker, Sec.....	Froatsburn.
	North Williamsburg	James Dickie, Sec.....	N. Williamsburg.
	Riverside, (Eager's).....	B. H. Hayunga, Sec.....	Morrisburg.
Winchester.....	Aults' No. 1.....	Chris. Irving, Sec.....	Cassbridge.
	Cassbridge Creamery	D. Halliday, Sec.....	do
	Chesterville, Connaught.. \ Ormond, Winch't'r Springs /	Wm. Eager, Prop.....	Morrisburg.
	Kendrick and Carlisle.....	W. R. Allison, Sec.....	Dunbar.
	Maple Ridge..... ..	R. D. Fulton, Sec	Chesterville.
	Morewood (Eager's)	John McCormick, Sec.....	Morewood.
	Rose & Co., No. 2.....	John McTavish, Sec	VanCamp.
	Union, (co-operative).....	George Carlyle, Sec.	Morewood.
STORMONT:			
Cornwall	*Black River, Nos. 1, 2 and 3.	P. N. Tait, Prop....	Mille Roches.
	*Cornwall Centre.....	A. E. Cline, Sec..	Eamer's Corners.
	Grant's Corners.....	Wm. Irvine, Prop.	Martintown.
	*Mille Roches....	P. N. Tait, Sec	Mille Roches.
	Moulinette	D. J. McGilles, Sec...	Moulinette
	Silmser's Corners.....	W. S. Friend, Sec.....	Cornwall.
Finch	Berwick No. 1 and 3.....	James Small, Prop.....	Berwick.
	Cahore	Wm. Eager, Prop.....	Morrisburg.
	Cannamore (Eager's).....	Robert Steven, Sec.....	Cannamore.
	Crysler	F. Richards, Sec.....	Crysler.
	Goldfield.....	D. H. McLean.....	South Finch.
Osnabruck	Dickenson Landing.....	Chas. S. Baker, Sec.....	Wales.
	Dixson.....	J. C. Stata, Sec	Lunenburg.
	Farran's Point.....	J. R. Farran, Sec..... ...	Farran's Point.
	Grantley.....	J. N. Logan, Prop.....	Elma.
	Lunenburg	H. McEwan, Sec	Lunenburg.
	North Osnabruck	Gordon Baker, Treas.....	Osnabruck Centre
	White Clover....	George H. Jackson, Treas...	Gallingertown.
Roxborough	Berwick No. 2.....	James, Small, Prop.....	Berwick.
	Goldfield No. 2.	John Fraser, Sec.....	Moose Creek.
	*Goldfield Nos. 3 and 4.....	C. H. Wood, Prop.....	Goldfield.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
GLENGARRY:			
Charlottenburg	Allangrove Comb. (9)	D. M. Macpherson, Prop.	Lancaster.
	Camerontown	Thomas McDonald, Prop.	Morrisburg.
	Lilly White	W. Irvine, Prop.	Martintown.
	*Tyotown	D. A. Loney, Sec.	Tyotown
Kenyon	Allangrove Comb (7)	D. M. Macpherson, Prop.	Lancaster.
	*Athol	C. H. Wood, Prop.	Goldfield.
	Diamond No. 2	J. H. Molloy, Sec.	Fenaghvale.
	*Greenfield, *Loch Garry	J. J. Cameron, Sec	Greenfield.
	*Spring Creek Comb (4)	W. D. McLeod, Prop	Kirkhill.
Lancaster	Breadalbane	J. C. McLaurin, Sec.	Dalkeith.
	Allangrove Comb (7)	D. M. Macpherson, Prop.	Lancaster.
	*Dalhousie Mills	James Irvine	Dalkeith.
	Pine Grove (Thistle Brand).	R. J. McArthur, Prop.	N. Lancaster.
Lochiel	*Dalkeith, *McCormick	James Irvine	Dalkeith.
	E. Hawkesbury, No. 3	James Hurley, Sec.	Barb.
	*Maple Grove	Kenneth McLennan, Sec.	Dalkeith.
	*Spring Creek Comb. (4)	W. D. McLeod, Prop.	Kirkhill.
PRESCOTT:			
Alfred	Alfred	F. W. Langrell, Sec	Alfred.
	Daoust	Gatien Parisien, Sec.	do
	Cote D'Or	Onesime Dubois	Lefaivre.
	Hughes	Eli Robinson, Sec.	Treadwell.
Caledonia	Diamond No. 1	J. H. Malloy, Sec.	Fenaghvale.
Hawkesbury	*Arnold	A. F. Arnold, Prop	Vankleek Hill.
	E. Hawkesbury, Nos. 1, 2&6	James Hurley, Sec.	Barb.
	Hawkesbury	W. H. Byers, Pres.	Hawkesbury.
	Maple Leaf	J. C. McAlpine, Sec.	St. Ann du Prescott.
	Maple Leaf, No. 1	Amede Leroux, Sec.	St. Eugene.
	Maple Leaf, No. 2	Joseph Seguin, Treas.	Point Fortune.
	*Monolea, No. 1	James Ross	Little Rideau.
	*Monolea, No. 4	John W. Ross	do
	*Spring Creek Comb. (7)	McCuaig, Cheney & Co. Props	Vankleek Hill.
	Spring Grove No. 1	S. N. Morrison, Prop.	Henry.
	Vankleek Hill	D. C. McKinnon, Mnfr.	Vankleek Hill.
	*One factory	John McNish	do
	* do	Wm. Wyman	Chute à Blondeau.
Longueuil	Cassburn, L'Orignal	R. H. Marston, Sec.	Cassburn.
Plantagenet	Chard	David Brown, Salesman	Chard.
	Fournier	Stephen Surch, Sec.	Fournier.
	Pendleton	Henry Moffatt, Prop.	Pendleton.
	Riceville, Burnside	A. McLean, Sec.	Riceville.
	St. Isidore	N. Parent, Prop.	St. Isidore.
	Star	John McCrank, Sec.	Curran.
	Treadwell	A. H. Chessar, Sec.	Plantagenet.
RUSSELL:			
Cambridge	Clarence	Damase Meilleur	Clarence.
Clarence	The Brook	Joseph Menard, Sec.	The Brook.
	The Lake	Dr. A. DesRosiers	Clarence Creek.
Cumberland	Russell, Nos. 1, 2, 3, 4 & 5	W. A. Munroe, Prop.	Navan.
Russell	Bolton	Wm. Eager, Prop.	Morrisburg.
	Riverside	D. McDonald, Sec.	Russell.
CARLETON:			
Fitzroy	River View	John Stevenson, Prop.	Kinburn.
	Union Pride	John Tierney, Sec.	Arnprior.
Goulbourn	Golden	Henry Vaughan, Sec.	Stapledon.
	Ottawa Valley	Adam Abbott, Sec.	Hazledean.
Gower N	Wellington	Wm. Eager, Prop.	Morrisburg.
	North Gower	Edward Kidd, Prop.	North Gower.
Marlborough	*Burritt's Rapids	do do	North Gower.
Nepean	Fallowfield	Wm. Eager, Prop.	Morrisburg.
Osgoode	Kenmore, Marvelville, Osgoode, Richmond		
	Gordon Model	H. D. MacDiarmid, Sec.	Dalmeny.
	Manotick	Geo. Harris, Sec.	Manotick.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
CARLETON.—*Con.*			
Osgoode.—*Con.*	Metcalfe	Thompson Eastman, Sec	Metcalfe.
	Osgoode, No. 10	A. Walker, Sec	do
	*White Globe, No. 2	James Fraser, Sec	Vernon.
	White Globe No. 3	John McCaul, Sec	do
RENFREW:			
Horton	Maple Home	Robert McLaren, Sec	Renfrew.
McNab	Waba	John Stewart, Sec	Waba.
Ross	Forester's Falls	Wm. Grant, Prop	Forester's Falls.
Wilberforce	Rankin	Jos. H. Graham, Sec	Rankin.
	Wilberforce	Thomas McKibbon, Sec	Eganville.
LANARK:			
Bathurst	*Fallbrook	Walter Cameron	Fallbrook.
	Harper	Joseph Warren, Sec	Harper.
	Scotch Line	Samuel Wilson, Salesman	Allan's Mills.
	Tay Banks	W. A. Moore, Sec	Perth.
Beckwith	Beckwith	Peter McDougall, Sec	Ashton.
	Valley Queen	Peter McEwen, Sec	Franktown.
Dalhousie	Watson's Corners, Brookside	W. A. Moore, Sec	Perth.
Drummond	Balderson	Andrew Allan, Sec	Balderson.
	Dexter	Donald McPhail, Sec	McPhail.
	Drummond Centre	Daniel Walsh	Drummond.
	*Mississippi, *Riverside	C. A. Matheson, Sec	Perth.
Elmsley N	Lone Star	B. S. Snider, Sec	Port Elmsley.
Lanark	Boyd's, No. 1	Alfred Hammond, Sec	Innisville.
	Clyde	James Herron, Sec	Herron's Mills.
	Fairplay	Thomas Jackson, Sec	Innisville.
	Hopetown	John Stewart, Sec	Hopetown.
	Middleville	A. R. McIntyre, Sec	Middleville.
Montague	Cedar Grove	Colin McNab, Sec	Smith's Falls.
	Montague	Isaac Cram, Sec	Smith's Falls.
	Roseville	Hugh Clark, Sec	Montague.
Pakenham	Pakenham	B. W. Dunnett, Sec	Pakenham.
	Appleton	Milton Teskey, Sec	Appleton.
	I. X. L.	Hiram McCreary, Sec	Carleton Place.
Ramsay	Mississippi Pride	James Robertson, Sec	Almonte.
	Rosedale	Alfred James, Sec	Clayton.
Sherbrooke S	Lake View	John McGuire, Sec	Westport.
VICTORIA:			
Eldon	Kirkfield	Wm. A. McRae, Sec	Kirkfield.
	Lorneville	Norman L. Campbell, Sec	Lorneville.
Emily	Downeyville	J. C. Lucas, Sec	Downeyville.
Fenelon	Cambray	H. J. Lytle, Sec	Cambray.
	Fenelon Falls	F. Sandford, Prop	Fenelon Falls.
Mariposa	Little Britain	Owen Yearsley, Prop	Little Britain.
	Mariposa	David Rogers, Sec	Linden Valley
Verulam	Bobcaygeon	J. L. Read, Sec	Bobcaygeon.
	*Dunsford	Edward Woolard, Sec	Dunsford.
	Scotch Line	Morgan Johns, Sec	Bobcaygeon.
PETERBOROUGH:			
Anstruther	Apsley	D. Anderson, Sec.-Treas	Apsley.
Asphodel	Norwood	Wm. Buck, Treas	Norwood.
	Ormond	James O'Reilly, Sec	Hastings.
	Westwood	John Lancaster, Sec	Westwood.
Belmont	Melrose Abbey	Samuel Elliott, Sec	Norwood.
	Round Lake	John Wright, Pres	Havelock.
	Star	James B. Peoples, Sec	Preneveau.
	*Trentbridge	Wm. Johnston, Pres	Trentbridge.
Douro	Maple Leaf	David Pilkey, Prop	Peterborough.
	Pine Grove	E. J. Abbott, Sec	Lakefield.
Dummer	*North Dummer	Richard Crown	Hall's Glen.
	*South Dummer	S. S. Spence	Cottesloe.
	Stony Lake	John A. Robb, Treas	Stony Lake.
	Warminster	S. R. Payne, Sec	Warsaw.
	Warsaw	B. James, Jun., Sec	do

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
PETERBOROUGH.—*Con.*			
Ennismore	*Myrtle	R. J. Scollard	Ennismore.
Harvey	*Lakehurst	Robert Tedford	Lakehurst.
Otonabee	Keene	D. P. McFarlane, Sec	Keene.
	Lang	David Nelson, Sec	Lang.
	Otonabee Union	George Stewart, Sec	Peterborough.
	*Peterborough	Wm. Gin vin, Sec	do
	Shearer	John Miller, Sec	Lang.
Smith	Central Smith	J. B. McEwan, Sec	Bridgenorth.
	Cherry Grove	J. G. Armstrong, Prop	Peterborough.
	Lakefield	W. W. Grant, Sec	Lakefield.
	Lakeview	Porter Robinson, Sec	Bridgenorth.
	Missing Link	James Middleton, Sec	Peterborough.
	North Smith	M. E. Sanderson, Sec	Selwyn.
	Trewern	G. W. Fitzgerald, Sec	Lakefield.
HALIBURTON:			
Cardiff	Deer Lake	Alfred W. Willis, Sec	Deer Lake.
Dysart	Dysart	Edward Holmes, Sec	Haliburton.
	Haliburton	George Bemister, Sec	do
Minden	Minden	M. Brown, Sec	Minden.
Monmouth	Wilberforce	Alex. Riley, Sec	Wilberforce.
Stanhope	Stanhope	Thomas Godwin, Sec	Boskung.
HASTINGS:			
Carlow and Mayo	Carlow	Andrew Whyte, Sec	Boulter.
	Carlow and Mayo Union	W. J. Douglas, Pres	Fort Stewart.
Dungannon	Bancroft	Fred. Mullett, Pres	Bancroft.
	L'Amable	J. R. Tait, Sec	L'Amable.
	Walkerville	D. Kavanagh, Pres	Umfraville.
Elzevir	*Bridgewater	Edward Sexsmith, Pres	Bridgewater.
	Elzevir	Wm. Wiggins, Pres	Queensborough.
Faraday	Page Road	George Orr, Pres	Faraday.
Herschel	Maynooth	John M. Third, Sec	Bancroft.
Hungerford	Bogart	Peter Lebarge, Pres	Bogart.
	*Cedar	Andrew Kirk	Tweed.
	Kervine	Patrick Murphy, Pres	Stoco.
	Marlbank	Wm. Burley, Sec	Marlbank.
	Moneymore	John Thompson, Sec	Moneymore.
	Roblin	James Clare, Pres	Chapman,
	Thomasburg	E. Elliott, Sec	Thomasburg.
	*Tweed	Thomas Graham, Pres	Tweed.
	Victoria	Wm. Brown, Sec	do
Huntingdon	Beulah	Martin Baker, Pres	Ivanhoe.
	Daisy	John O'Reilly, Sec	Madoc.
	Glen	Samuel Ray, Pres	Fuller.
	Moira	W. H. Morton, Pres	Moira.
	West Huntingdon	James Haggerty, Pres	West Huntingdon
	White Lake	Hector Wood, Pres	Ivanhoe.
Madoc	Allen Settlement	W. J. Allen, Pres	Cooper.
	Alexandria	John Caskey, Pres	Madoc.
	Brook Valley	Thomas Burnside, Pres	do
	Cold Spring	A. M. Ketcheson, Pres	do
	Golden	James English, Pres	do
	Madoc	Arch. Thompson, Pres	Queensborough.
	Spring Creek	Wm. Thompson, Pres	Remington.
	Spring Hill	D. McKenzie, Pres	Madoc.
Marmora	Deloro	Ralph Laycock, Pres	Deloro.
	Marmora, Cook, Riverside	Wm. Hilton, Salesman	Marmora.
Monteagle	Greenview	Edward Leveck, Sec	Greenview.
	Hybla	George A. Bartlett, Pres	Hybla.
Rawdon	Diamond	George A. Johnson, Pres	Stirling.
	Enterprise	Turner Sine, Pres	Sine.
	Evergreen	Robert Lanigan, Pres	Stirling.
	Harold	John Tanner, Pres	Harold.
	Kingston	James T. Belshaw, Pres	Stirling.
	Maple Leaf	Thomas McKeown, Pres	Big Springs.
	Plum Grove	James Duncan, Pres	Wellman's Corners
	Springbrook	Thomas J. Thompson, Pres	Springbrook.
	Stirling	Hiram Conley, Pres	Stirling.

CHEESE FACTORIES IN ONTARIO.—*Continued.*

County and Township.	Name of Factory.	Name of Secretary or other Officer.	Post Office Address.
HASTINGS:—*Continued.*			
Sidney	Bay View	R. J. Graham, Sec	Belleville.
	Frankford	Joshua Anderson, Pres	Frankford.
	Front of Sidney	A. P. Meyers, Salesman	Trenton.
	Grove	A. B. Mallory, Pres	Frankford.
	Johnston	E. Harry, Sec	Glen Miller.
	Shamrock	Oakley Vandervoort, Pres	Stirling.
	Sidney	J. R. Brower, Pres	Belleville.
	*Sidney Town Hall	S. T. Wilmott, Pres	Wallbridge.
	Springfield	Thomas Steele, Pres	Trenton.
Thurlow	Ashley	Harford Ashley, Sec	Belleville.
	Bronk	James Boldrick, Pres	Canifton.
	East Hastings	W. A. Chapman, Sec	Roslin.
	Halloway	P. R. Daly, Pres	Foxboro'
	Thurlow	O. R. Weese, Pres	Belleville.
	Union	F. Brenton, Pres	Corbyville.
	Zion	Wm. Sills, Pres	Foxboro'
Tudor	*Millbridge	Chas Donaldson, Sec	Millbridge.
Tyendinaga	Albert	Michael Corrigan, Pres	Albert.
	Gould's Cheddar	Peter Gould, Sec	Napanee.
	Melrose	A. J. McLaren, Sec	Melrose.
	Mountain	R. L. Lazier	Shannonville.
	Read	Patrick Boland, Treas	Naphan.
	*Rosebud	Alex. Coulter, Sec	Myrehall.
	Shannonville	Wm. Clazie, Pres	Belleville.
Wollaston	Coe Hill	R. S. Tivy, Pres	Coe Hill.

CREAMERIES IN ONTARIO IN 1891.

County and Township.	Name of Creamery.	Name of Secretary or other Officer.	Post Office Address.
LAMBTON :			
Plympton	Wanstead	Arch. Wark, Prop	Wanstead.
HURON :			
Goderich	Goderich (Town)	John Hannah, Prop.	Seaforth.
Grey	*Molesworth	Horace Cummings	Molesworth.
Hullett	Londesborough	George Watt, Pres.	Harlock.
McKillop	Seaforth (Town)	John Hannah, Prop.	Seaforth.
Tuckersmith	Brucefield	Hugh McCartney	Brucefield.
BRUCE :			
Brant	Walkerton (Brill's)	George Balkwell, Mgr	Walkerton.
Carrick	Mildmay	John Henderson, Sec	Mildmay.
Culross	*Formosa	Ambrose Zettel, Sec	Formosa.
	Star	S. R. Brill, Sec.	Teeswater.
Elderslie	Chesley	W. Halliday, Sec.	Chesley.
	Dobbinton	James Douglas	Dobbinton.
Kinloss	Whitechurch	John J. W. Simpson, Sec	Whitechurch.
GREY :			
Derby	*Rock Spring	Wm. Gladstone	Owen Sound.
Egremont	Dromore	John Philp, Sec	Dromore.
	Holstein	David Allen, Sec	Holstein.
Glenelg	Durham	A. M. Dargaval, Prop.	Durham.
Normanby	Ayton	Isaac Wenger, Prop	Ayton.
	Saugeen Valley	John B. Ashley, Sec	Neustadt.
Sydenham	Pleasant View	James Struthers, Prop	Owen Sound.
MIDDLESEX :			
London	*Medway	Jas. Carmichael	Arva.
PERTH :			
Blanshard	Kirkton	John Hannah, Prop.	Seaforth.
WELLINGTON :			
Guelph	Ontario	John McHardy, Mgr	Guelph.
WATERLOO :			
Waterloo	*Breslau	M. Brubacher	Breslau.
Wellesley	Crosshill	John T. Wilford, Sec	Crosshill.
Wilmot	†Nith Valley	Henry D. Tye, Sec	Haysville.
Woolwich	St. Jacobs	Brubacher & Snyder, Props.	St. Jacobs.
DURHAM :			
Cartwright	Cedar Grove	Robert Philip, Prop.	Cadmus.
PRINCE EDWARD :			
Ameliasburg	†Sprague	John Sprauge, Salesman	Ameliasburg.
	*Willow Glen	A. C. Miller, Prop	Picton.
LEEDS AND GRENVILLE :			
Edwardsburg	Ventnor	Miller and Ferguson. Props.	Spencerville.
Yonge	Twin Elms	C. Johnson & Son, Props	Athens.
DUNDAS :			
Matilda	Banford & Johnston	G. W. Collison, Sec	Hainsville.
	Rutherford	Richard Gibbons, Sec	Irena.
Williamsburg	*Dunbar	Matthew Carlyle, Sec	Dunbar.
STORMONT :			
Osnabruck	†Stormont	John H. Croil	Aultsville.
GLENGARRY :			
Charlottenburg	Gore	Abrams & McLennan, Prop.	Summerstown.
RUSSELL :			
Clarence	*The Brook	Joachim Bellefeuille, Prop	The Brook.
Russell	*St. Onge	Mr. Dupuis	St. Onge

† Makes both butter and cheese.

STATISTICS OF

LIVE STOCK AND DAIRY PRODUCTS

HORSES AND HOGS.

TABLE I. Showing by County Municipalities and groups of Counties the numbers of Horses and Hogs in Ontario in the years 1890 and 1891.

Counties.	Horses.					Hogs.			
	Working horses.	Breeding mares.	Unbroken horses.	Totals.		Over 1 year.	Under 1 year.	Totals.	
				1891.	1890.			1891.	1890.
Essex	8,142	3,178	6,548	17,868	19,054	10,480	45,780	56,260	59,581
Kent	10,537	4,828	9,606	24,971	23,060	10,472	49,931	60,403	70,505
Elgin	7,922	3,077	5,723	16,722	16,427	7,371	32,279	39,650	46,475
Norfolk	6,900	2,510	4,752	14,162	13,581	5,694	28,485	34,179	34,096
Haldimand	5,564	2,380	4,388	12,332	12,183	3,572	17,408	20,980	19,303
Welland	5,651	1,521	3,495	10,667	9,930	1,946	9,966	11,912	12,675
Totals	44,716	17,494	34,512	96,722	94,235	39,535	183,849	223,384	242,635
Lambton	8,758	3,447	6,770	18,975	18,237	3,841	19,144	22,985	29,050
Huron	13,145	7,166	12,318	32,629	31,352	7,572	35,636	43,208	43,689
Bruce	10,625	4,965	8,163	23,753	22,629	7,054	29,048	36,102	34,767
Totals	32,528	15,578	27,251	75,357	72,218	18,467	83,828	102,295	107,506
Grey	14,150	5,692	8,941	28,783	27,496	10,109	39,419	49,528	46,522
Simcoe	13,376	5,260	8,742	27,378	26,201	11,583	43,489	55,072	49,106
Totals	27,526	10,952	17,683	56,161	53,697	21,692	82,908	104,600	95,628
Middlesex	14,211	6,098	11,232	31,541	32,411	6,932	40,348	47,280	54,397
Oxford	10,589	3,889	6,777	21,255	19,118	6,383	40,981	47,364	40,813
Brant	5,175	1,776	3,120	10,071	10,154	3,981	17,344	21,325	18,624
Perth	9,521	4,471	7,489	21,481	20,736	5,311	30,221	35,532	35,236
Wellington	11,335	5,003	7,841	24,179	24,148	7,238	38,342	45,580	47,247
Waterloo	7,293	2,503	3,861	13,662	13,371	3,087	22,129	25,216	23,723
Dufferin	5,236	2,245	3,209	10,690	9,703	3,664	17,382	21,046	19,270
Totals	63,360	25,990	43,529	132,879	129,641	36,596	206,747	243,343	239,310
Lincoln	5,780	1,565	3,238	10,583	9,660	2,040	11,771	13,811	13,864
Wentworth	7,568	2,375	3,907	13,850	14,038	3,146	19,426	22,572	21,050
Halton	5,446	1,356	2,525	9,327	9,600	1,858	12,123	13,981	16,257
Peel	7,047	2,284	4,475	13,806	13,768	3,837	21,262	25,099	23,591
York	13,130	5,785	8,754	27,669	27,332	7,010	37,547	44,557	48,965
Ontario	9,733	4,463	7,664	21,860	21,633	6,088	30,579	36,667	33,370
Durham	8,158	2,737	5,010	15,905	15,282	4,300	20,909	25,209	21,061
Northumberland	9,271	3,072	6,102	18,445	17,172	5,244	20,660	25,904	22,101
Prince Edward	5,644	2,166	4,461	12,271	12,086	2,436	9,249	11,685	10,726
Totals	71,777	25,803	46,136	143,716	140,571	35,959	183,526	219,485	210,985
Lennox & Addington	5,435	1,808	3,480	10,723	11,070	2,710	9,630	12,340	11,409
Frontenac	5,760	1,637	2,843	10,240	10,083	2,645	9,773	12,418	12,462
Leeds & Grenville	11,204	2,931	5,383	19,518	19,993	8,717	20,235	28,952	29,987
Dundas	4,740	1,335	2,512	8,587	8,347	2,873	7,502	10,375	10,936
Stormont	3,814	1,314	2,600	7,728	7,727	2,356	5,050	7,406	8,059
Glengarry	4,169	2,307	3,462	9,938	10,064	3,057	6,356	9,413	10,668
Prescott	3,867	1,683	3,049	8,599	7,825	3,563	6,571	10,134	9,697
Russell	2,432	964	1,485	4,881	5,258	2,380	5,555	7,935	7,427
Carleton	7,571	3,096	4,366	15,033	14,843	5,276	17,059	22,335	21,480
Renfrew	7,208	2,699	4,236	14,143	13,236	8,872	12,773	21,645	19,404
Lanark	6,118	1,847	3,405	11,370	10,513	4,285	14,850	19,135	15,094
Totals	62,318	21,621	36,821	120,760	118,959	46,734	115,354	162,088	156,623
Victoria	6,466	2,844	4,905	14,215	13,658	5,516	18,775	24,291	22,103
Peterborough	5,775	2,148	3,653	11,576	10,674	5,290	17,851	23,141	20,871
Haliburton	767	400	527	1,694	1,258	860	1,713	2,573	2,505
Hastings	9,168	2,663	5,440	17,271	18,211	9,301	23,558	32,859	29,720
Totals	22,176	8,055	14,525	44,756	43,801	20,967	61,897	82,864	75,199
Muskoka	1,465	628	709	2,802	2,426	1,202	4,131	5,333	4,072
Parry Sound	1,115	462	555	2,132	1,615	912	3,483	4,395	2,951
Nipissing	520	111	98	729	460	332	540	872	859
Algoma	1,235	494	716	2,445	2,013	1,729	5,928	7,657	4,791
Totals	4,335	1,695	2,078	8,108	6,514	4,175	14,082	18,257	12,673
The Province	328,736	127,188	222,535	678,459	659,636	224,125	932,191	1,156,316	1,140,559

CATTLE.

TABLE II. Showing by County Municipalities and groups of Counties the number of Cattle in Ontario in the years 1890 and 1891.

Counties.	Working oxen.	Milch cows.		Store cattle over 2 years.		Young and other cattle.	Totals.	
		1891.	1890.	1891.	1890.		1891.	1890.
Essex	158	13,678	14,600	7,810	9,030	15,105	36,751	40,220
Kent	123	16,832	18,311	12,117	13,494	23,572	52,644	56,376
Elgin	115	18,221	18,608	11,878	9,239	20,877	51,091	48,145
Norfolk	202	14,872	14,031	4,109	3,481	12,874	32,057	29,733
Haldimand	67	11,582	12,231	3,585	4,077	12,079	27,313	27,947
Welland	253	8,727	8,739	2,524	2,804	8,249	19,753	20,205
Totals	918	83,912	86,520	42,023	42,125	92,756	219,609	222,626
Lambton		17,407	18,693	15,677	17,532	27,977	61,061	63,615
Huron	201	28,942	29,431	30,278	31,619	49,646	109,067	104,720
Bruce	523	26,780	26,565	19,988	19,897	40,922	88,213	83,401
Totals	724	73,129	74,690	65,943	69,048	118,545	258,341	251,736
Grey	584	32,514	32,465	25,435	22,367	51,227	109,760	103,338
Simcoe	279	23,657	23,816	14,671	14,075	33,147	71,754	67,437
Totals	863	56,171	56,281	40,106	36,442	84,374	181,514	170,775
Middlesex		34,792	35,864	34,476	28,292	49,012	118,280	108,564
Oxford	97	34,526	35,194	11,551	12,007	26,026	72,200	70,871
Brant	57	9,932	10,584	2,385	3,197	10,707	23,081	23,694
Perth	36	26,005	26,137	14,057	15,380	33,602	73,700	73,008
Wellington	147	24,109	24,635	15,703	16,365	35,601	75,560	74,426
Waterloo	132	13,705	13,728	4,324	4,819	15,505	33,666	33,590
Dufferin	93	9,414	9,501	8,272	7,360	14,514	32,293	30,106
Totals	562	152,483	155,643	90,768	87,420	184,967	428,780	414,259
Lincoln	73	8,303	7,506	2,644	2,738	7,286	18,306	16,967
Wentworth		12,651	13,679	3,372	3,138	11,819	27,842	27,451
Halton	101	8,984	10,162	4,702	4,956	10,364	24,151	24,632
Peel		11,800	11,558	4,911	4,900	11,032	27,743	26,527
York	25	21,887	21,971	6,877	6,988	16,739	45,528	43,157
Ontario	41	16,463	15,832	8,763	8,506	23,694	48,961	46,869
Durham	21	11,219	10,912	5,742	5,358	16,067	33,049	29,540
Northumberland	129	21,522	19,959	4,722	4,588	18,819	45,192	38,621
Prince Edward	73	10,100	10,064	2,079	1,323	8,447	20,699	18,227
Totals	463	122,929	121,643	43,812	42,495	124,267	291,471	271,991
Lennox and Addington	142	14,533	14,671	5,217	3,584	14,320	34,212	28,814
Frontenac	315	18,295	16,675	4,618	4,689	15,088	38,316	35,804
Leeds and Grenville	27	46,145	45,597	7,484	5,817	25,491	79,150	74,285
Dundas		16,016	16,756	2,089	2,252	8,045	26,150	26,204
Stormont		15,538	15,824	2,529	2,539	6,733	24,800	26,016
Glengarry		17,891	19,319	2,145	1,710	9,544	29,580	31,052
Prescott		13,298	11,999	1,489	2,404	10,020	24,807	21,760
Russell	35	7,405	7,053	1,617	2,550	5,936	14,993	15,903
Carleton		22,529	24,123	6,607	7,251	20,291	49,427	47,556
Renfrew	81	18,751	17,886	10,089	7,770	21,685	50,606	47,599
Lanark	97	20,195	19,587	8,817	7,071	20,941	50,050	44,485
Totals	697	210,596	209,490	52,701	47,637	158,097	422,091	399,478
Victoria	113	11,515	11,935	7,050	6,337	16,714	35,392	33,404
Peterborough	174	14,909	14,527	4,246	4,377	14,409	33,738	31,246
Haliburton	227	2,780	2,622	1,147	1,083	4,000	8,154	7,544
Hastings	389	32,147	33,296	6,027	6,309	22,995	61,558	59,711
Totals	903	61,351	62,380	18,470	18,106	58,118	138,842	131,905
Muskoka	520	4,698	4,471	1,600	1,559	6,527	13,345	11,884
Parry Sound	589	3,566	2,785	1,735	1,166	5,219	11,109	8,380
Nipissing	59	897	738	254	359	1,021	2,231	2,020
Algoma	418	3,502	3,197	1,906	1,283	5,656	11,482	9,658
Totals	1,586	12,663	11,191	5,495	4,367	18,423	38,167	31,942
The Province	6,716	773,234	777,838	359,318	347,640	839,547	1,978,815	1,894,712

SHEEP AND POULTRY.

TABLE III. Showing by County Municipalities and groups of Counties the numbers of Sheep and of Poultry in Ontario in the years 1890 and 1891.

Counties.	Sheep.				Poultry.				
	Over 1 year.	Under 1 year.	Totals.		Turkeys	Geese.	Other fowls.	Totals.	
			1891.	1890.				1891.	1890.
Essex	15,324	12,868	28,192	27,911	10,074	15,922	184,267	210,263	158,695
Kent	20,839	16,652	37,491	36,228	17,185	11,275	174,553	203,013	194,234
Elgin	25,870	22,474	48,344	40,305	12,059	6,735	139,628	158,432	176,844
Norfolk	16,220	13,928	30,148	23,145	8,826	4,607	116,031	129,464	136,739
Haldimand	15,287	13,103	28,390	25,402	6,401	6,374	106,990	119,765	123,808
Welland	12,152	9,809	21,961	19,968	8,166	5,122	87,517	100,805	102,887
Totals	105,692	88,834	194,526	172,959	62,721	50,035	808,986	921,742	893,207
Lambton	25,587	21,902	47,489	44,412	12,358	12,311	173,166	197,835	194,920
Huron	49,638	43,329	92,967	71,429	17,819	25,126	303,333	346,278	353,108
Bruce	51,038	44,674	95,712	72,020	12,318	20,105	209,173	241,596	230,610
Totals	126,263	109,905	236,168	187,861	42,495	57,542	685,672	785,709	778,638
Grey	72,983	58,350	131,333	102,737	19,641	26,153	267,322	313,116	304,973
Simcoe	43,083	30,941	74,024	60,401	21,050	21,767	247,904	290,721	279,467
Totals	116,066	89,291	205,357	163,138	40,691	47,920	515,226	603,837	584,440
Middlesex	41,725	34,170	75,895	56,435	30,471	17,386	296,784	344,641	359,691
Oxford	14,812	14,121	28,933	19,598	12,036	9,354	174,638	196,028	202,356
Brant	11,190	9,352	20,542	17,781	5,359	4,496	88,488	98,343	93,770
Perth	29,109	26,144	55,253	44,107	14,229	18,669	220,673	253,571	247,169
Wellington	44,340	36,721	81,061	63,220	16,404	19,198	212,547	248,149	261,424
Waterloo	21,276	15,918	37,194	30,163	7,238	5,542	136,127	148,907	138,961
Dufferin	16,766	12,718	29,484	24,099	7,791	9,830	100,426	118,047	121,017
Totals	179,218	149,144	328,362	255,403	93,528	84,475	1,229,683	1,407,686	1,424,388
Lincoln	9,841	9,012	18,853	13,175	6,593	3,365	75,752	85,710	87,912
Wentworth	14,750	11,551	26,301	20,516	9,432	4,666	104,418	118,516	125,918
Halton	10,059	8,242	18,301	15,031	5,258	6,542	76,535	88,335	94,195
Peel	13,745	10,077	23,822	15,064	19,184	17,641	132 148	168,973	156,390
York	22,061	15,928	37,989	31,669	19,038	15,683	210,059	244,780	240,689
Ontario	26,468	21,295	47,763	34,809	12,580	14,770	198,354	225,704	201,489
Durham	25,478	18,424	43,902	24,262	15,636	12,223	139,000	166,859	165,959
Northumb'rl'd	18,264	14,458	32,722	24,206	15,546	13,508	151,673	180,727	174,376
Prince Edw'd	7,039	6,361	13,400	10,348	5,338	2,996	103,550	111,884	103,203
Totals	147,705	115,348	263,053	189,080	108,605	91,394	1,191,489	1,391,488	1,350,131
Lennox & Ad.	9,962	8,375	18,337	16,542	4,221	4,020	85,656	93,897	103,935
Frontenac	16,454	14,625	31,079	23,128	6,421	5,208	106,263	117,892	94,979
Leeds & Gren.	24,906	20,726	45,632	42,571	24,159	14,159	179,263	217,581	236,714
Dundas	6,896	5,840	12,736	10,612	9,098	5,555	86,528	101,181	106,333
Stormont	5,733	4,300	10,033	9,746	3,949	3,893	72,137	79,979	86,464
Glengarry	13,404	7,796	21,200	15,745	3,791	6,676	83,914	94,381	99,980
Prescott	8,008	5,868	13,876	13,778	7,033	5,815	61,052	73,900	74,796
Russell	7,338	6,330	13,668	10,009	5,898	4,204	42,349	52,451	47,577
Carleton	19,229	16,511	35,740	31,043	23,669	16,237	146,956	186,862	187,581
Renfrew	38,510	29,242	67,752	51,548	12,178	11,916	108,131	132,225	117,332
Lanark	32,223	24,890	57,113	42,489	20,269	11,796	125,092	157,157	139,072
Totals	182,663	144,503	327,166	267,211	120,686	89,479	1,097,341	1,307,506	1,294,763
Victoria	22,311	16,238	38,549	27,731	15,062	9,042	132,144	156,248	132,146
Peterborough	14,892	12,247	27,139	20,268	7,756	9,214	118,104	135,074	127,851
Haliburton	4,107	3,020	7,127	4,977	1,233	1,333	16,300	18,866	15,883
Hastings	16,838	13,956	30,794	23,752	7,263	11,357	150,339	168,959	161,763
Totals	58,148	45,461	103,609	76,728	31,314	30,946	416,887	479,147	437,637
Muskoka	7,202	5,515	12,717	9,651	3,206	2,342	31,860	37,408	32,146
Parry Sound	5,003	3,591	8,594	6,450	1,507	1,362	24,738	27,607	22,965
Nipissing	546	442	988	695	462	312	8,314	9,088	7,171
Algoma	7,207	6,004	13,211	10,519	2,692	2,483	29,697	34,872	29,378
Totals	19,958	15,552	35,510	27,315	7,867	6,499	94,609	108,975	91,660
The Province	935,713	758,038	1,693,751	1,339,695	507,907	458,290	6,039,893	7,006,090	6,854,864

WOOL.

TABLE IV. Showing by County Municipalities and groups of Counties the clip of Wool in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91; also the average number of pounds per fleece.

Counties.	1891.			1890.			Yearly average for the ten years 1882-91.		
	No. of fleeces.	Pounds.	lb. per fleece.	No. of fleeces.	Pounds.	lb. per fleece.	No. of fleeces.	Pounds.	lb. per fleece.
Essex	15,442	88,776	5.75	15,401	83,898	5.45	14,582	81,878	5.62
Kent	21,136	127,116	6.01	20,447	113,515	5.55	20,682	118,101	5.71
Elgin	26,277	153,872	5.86	23,021	133,457	5.80	23,050	131,821	5.72
Norfolk	16,484	91,010	5.52	13,245	72,753	5.49	16,657	88,286	5.30
Haldimand	15,345	95,351	6.21	15,282	89,246	5.84	17,723	104,974	5.92
Welland	12,456	61,724	4.96	11,845	60,503	5.11	14,036	70,866	5.05
Totals	107,140	617,849	5.77	99,241	553,372	5.58	106,730	595,926	5.58
Lambton	27,389	163,504	5.97	24,733	145,390	5.88	25,494	148,695	5.83
Huron	50,891	296,123	5.82	39,384	233,098	5.92	48,461	275,843	5.69
Bruce	52,330	311,521	5.95	44,831	271,869	6.06	48,412	277,539	5.73
Totals	130,610	771,148	5.90	108,948	650,357	5.97	122,367	702,077	5.74
Grey	74,715	427,409	5.72	62,692	357,379	5.70	69,871	386,815	5.54
Simcoe	43,959	255,812	5.82	37,126	209,817	5.65	44,922	248,519	5.53
Totals	118,674	683,221	5.76	99,818	567,196	5.68	114,793	635,334	5.53
Middlesex	41,491	257,580	6.21	33,017	200,235	6.06	38,022	226,620	5.96
Oxford	15,072	87,802	5 83	11,435	64,603	5.65	19,292	110,128	5.71
Brant	11,509	67,741	5.89	10,074	58,103	5.77	13,825	79,182	5.73
Perth	29,560	182,668	6.18	26,128	157,185	6.02	32,022	182,199	5.69
Wellington	45,306	274,048	6.05	38,235	225,946	5.91	47,375	270,299	5.71
Waterloo	21,505	122,669	5.70	18,380	102,289	5.57	22,286	120,764	5.42
Dufferin	17,070	103,066	6.04	14,646	84,971	5.80	17,921	100,973	5.63
Totals	181,513	1,095,574	6.04	151,915	893,332	5.89	190,743	1,090,165	5.72
Lincoln	10,093	57,215	5.67	7,703	40,151	5.21	10 326	53,365	5.17
Wentworth	15,257	90,566	5.94	12.094	69,195	5.72	15,049	85,430	5.68
Halton	10,262	67,090	6.54	8,705	55,811	6.41	11,612	71,996	6.20
Peel	14,104	96,354	6.83	8,850	59,383	6.71	15,227	99,571	6.54
York	22,647	142,443	6.29	20,366	119,912	5.89	27,085	162,105	5.99
Ontario	27,001	178,553	6.61	20,942	126.623	6.05	27,068	166,465	6.15
Durham	25,762	157,797	6.13	15,518	91,072	5.87	21,437	124,785	5.82
Northumberland	18,955	110,220	5.81	14,371	86,203	6.00	20,439	117,051	5.73
Prince Edward	7,101	39,892	5.62	6,101	33,194	5.44	9,279	49,022	5.28
Totals	151,182	940,130	6.22	114,650	681,544	5.94	157,522	929,790	5.90
Lennox and Addington	10,071	55,367	5.50	9,594	55,228	5.76	14,440	76,207	5.28
Frontenac	16,526	85,401	5.17	14.377	78,717	5.48	18,386	92,658	5.04
Leeds and Grenville	25,287	127,553	5.04	24,596	127,943	5.20	35,886	174,698	4.87
Dundas	7,141	37,110	5.20	5,936	32,027	5.40	10,542	52,687	5.00
Stormont	6,049	34,212	5.66	6,703	36,347	5.42	9,522	49,391	5.19
Glengarry	13,634	70,157	5.15	10,100	52,089	5.16	15,313	72,201	4.72
Prescott	8,208	45,939	5.60	8,622	45,055	5.23	10,702	52,781	4.93
Russell	7,592	42,865	5.65	6,343	35,297	5 56	7,868	38,483	4.89
Carleton	19,348	103,524	5.35	19,930	104,743	5.26	27,898	141,396	5.07
Renfrew	38,980	189,313	4.86	33,748	165,218	4.90	37,270	170,188	4.57
Lanark	33,000	167,101	5.06	28,505	141,909	4 98	33,252	160,328	4.82
Totals	185,836	958,542	5.16	168,454	874,573	5.19	221,079	1,081,018	4.89
Victoria	22,685	124,726	5.50	17,378	100,247	5.77	21,778	120.627	5.54
Peterborough	15,051	82,866	5.51	12,377	64,990	5.25	16,694	88,126	5.28
Haliburton	4,180	20,693	4.95	3,065	15,239	4.97	3,450	16,501	4.78
Hastings	17,107	86,286	5.04	15,068	81,450	5.41	24,774	121,467	4.90
Totals	59,023	314,571	5.33	47,888	261,926	5.47	66,696	346,721	5.20
Muskoka	7,425	39,643	5.34	5,549	29,076	5.24	5,988	32,091	5.36
Parry Sound	5,187	29,634	5.71	4,082	22,498	5.51	2,564	14,690	5.73
Nipissing	598	3,211	5.37	466	2.177	4.67	107	539	5.04
Algoma	7,334	44,618	6.08	6,475	38,649	5.97	3,835	22,876	5.97
Totals	20,544	117,106	5.70	16,572	92,400	5.58	12,494	70,196	5.62
The Province	954,522	5,198,141	5.76	807,486	4,574,700	5.67	992,424	5,451,227	5.49

FACTORY CHEESE.

TABLE V. Showing by County Municipalities and groups of Counties the quantity and value of Cheese made at 702 factories in Ontario in 1891, the average dates of opening and closing, and the total number of factories reported In operation.

Counties.	Factories in operation.	Factories making returns.	Quantity of—		Gross value of cheese.	No. of patrons.	Milk required to make 1 lb. cheese.	Value of cheese per 100 lb.	Average date of opening.	Average date of closing.
			Milk used.	Cheese made.						
	No.	No.	lb.	lb.	$		lb.	$ c.		
Essex	1	1	158,700	13,800	1,226	36	11.50	8 88	June 2	Aug. 18
Kent	9	4	2,547,913	233,120	21,687	198	10.93	9 30	May 13	Oct. 18
Elgin	25	20	26,443,532	2,459,109	229,225	1,452	10.75	9 32	Ap. 27	Nov. 10
Norfolk	22	19	17,607,531	1,653,529	152,878	1,463	10.65	9 25	May 3	" 5
Haldimand	10	7	6,459,790	600,779	55,046	526	10.75	9 16	" 11	Oct. 25
Welland	3	2	2,298,047	216,107	19,726	153	10.63	9 13	" 11	Nov. 15
Total	70	53	55,515,513	5,176,444	479,788	3,828	10.72	9 27	" 4	" 2
Lambton	13	11	9,673,626	913,327	85,928	855	10.59	9 41	" 19	" 9
Huron	14	13	15,987,215	1,488,605	140,719	1,222	10.74	9 45	" 15	Oct. 31
Bruce	22	22	24,047,284	2,255,353	212,705	1,688	10.66	9 43	" 17	" 29
Total	49	46	49,708,125	4,657,285	439,352	3,765	10.67	9 43	" 17	Nov. 1
Grey	11	11	9,269,903	869,081	80,850	701	10.67	9 30	" 19	Oct. 24
Simcoe	9	8	3,765,037	360,239	33,147	380	10 45	9 20	" 20	" 25
Total	20	19	13,034,940	1,229,320	113,997	1,081	10.60	9 27	" 20	" 24
Middlesex	39	32	47,671,240	4,433,925	418,984	2,544	10.75	9 45	" 1	Nov. 12
Oxford	43	37	81.280,939	7,611,624	715,534	2,911	10.68	9 40	Apr. 20	" 22
Brant	7	4	5,833,575	549,947	51,204	300	10.61	9 31	" 23	" 20
Perth	26	25	40,023,778	3,724,426	357,614	2,047	10.75	9 60	May 6	" 8
Wellington	11	9	14,483,235	1,353,314	127,937	896	10.70	9 45	" 17	Oct. 31
Waterloo	5	5	4,333,925	399,462	38,296	298	10.85	9 59	" 10	" 25
Dufferin	2	2	1,065,857	100,112	9,032	77	10.65	9 02	" 22	" 17
Total	133	114	194,692,549	18,172,810	1,718,601	9,073	10 71	9 46	Apr. 30	Nov. 13
Lincoln	3	2	2,155,219	200,661	18,638	192	10.74	9 29	May 5	" 7
Wentworth	3	3	2,898,036	271,745	24,952	150	10.66	9 18	" 13	Oct. 31
Peel	1	1	260,000	24,760	2,360	22	10.50	9 53	June 1	" 15
York	3	2	357,772	33,933	3,349	36	10.54	9 87	May 30	Sept. 19
Ontario	1	1	314,692	28,057	2,623	42	11.22	9 35	" 25	Oct. 9
Durham	11	11	5,887,075	541,586	50,070	501	10.87	9 25	" 12	" 29
Northumberland	36	33	31,938,462	2,998,808	280.453	1,564	10.65	9 35	Apr. 27	Nov. 2
Prince Edward	17	14	14,472,292	1,380,490	127,768	1,080	10.48	9 26	May 1	Oct. 30
Total	75	67	58,283,548	5,480,040	510,213	3,587	10.64	9 31	" 3	" 30
Lennox & Addington	24	23	34,430,862	3,365,045	316,539	1,911	10.23	9 41	Apr. 30	Nov. 4
Frontenac	38	27	19,552,118	1,881,704	175,302	815	10.39	9 32	May 3	Oct. 30
Leeds and Grenville	109	90	89,984,660	8,511,030	790,458	3,546	10.57	9 29	Apr. 25	Nov. 2
Dundas	36	32	26,537,590	2,552,502	237,028	1,074	10.40	9 29	May 1	" 2
Stormont	25	18	16,134,011	1,553,551	142,948	829	10.39	9 20	" 5	" 1
Glengarry	45	29	14,913,085	1,404,394	128,609	753	10.62	9 16	" 12	Oct. 30
Prescott	36	24	14,816,691	1,455,081	133,560	717	10.18	9 18	" 2	" 31
Russell	10	10	4,986,250	487,233	45,112	286	10.23	9 26	" 8	" 30
Carleton	18	16	9,788,689	934,861	86,492	526	10.47	9 25	" 17	" 27
Renfrew	5	5	2,644,938	253,637	22,925	187	10.43	9 04	" 21	" 18
Lanark	28	25	22,791,719	2,185,780	200,972	1,238	10.43	9 19	" 11	" 24
Total	374	299	256,580,613	24,584,818	2,279,945	11,882	10.44	9 27	" 3	" 31
Victoria	10	9	4,879,109	452,064	41,524	390	10.79	9 19	" 16	" 29
Peterborough	29	23	22,328,809	2,067,056	190,483	1,140	10.80	9 22	" 5	" 30
Haliburton	6	6	1,025,414	102,420	9,256	92	10.01	9 04	" 23	" 22
Hastings	72	66	68,949,481	6,710,425	630,745	2,914	10.27	9 40	Apr. 26	Nov. 1
Total	117	104	97,182,813	9,331,965	872,008	4,536	10.41	9 34	May 1	Oct. 31
The Province	838	702	724,998,101	68,632,682	6,413,904	37,752	10.56	9 35	May 4	Nov. 2
Estimated at 136 factories not reported		136	140,455,473	13,296,360	1,242,580	7,314				
Total for 838 factories		838	865,453,574	81,929,042	7,656,484	45,066				

PART III.

VALUES, RENTS AND FARM WAGES.

VALUES OF FARM PROPERTY.

Under the head of land, buildings, implements and live stock the table following gives the value of farm property by county groups for the years 1890 and 1891, the total for the province in these years, and the average for the ten years 1882-91 :

Districts.		Farm land.	Buildings.	Implements.	Live stock.	Total farm property.
		$	$	$	$	$
Lake Erie	1891	88,701,279	25,713,724	6,883,952	13,751,560	135,050,515
	1890	87,352,875	25,399,366	6,784,793	13,822,445	133,359,479
Lake Huron	1891	69,431,012	19,499,390	5,454,333	13,548,985	107,933,720
	1890	69,912,071	19,495,144	5,407,097	12,611,995	107,426,307
Georgian Bay	1891	48,372,436	14,630,536	4,292,456	9,475,312	76,770,740
	1890	48,931,045	14,392,172	4,285,087	8,781,252	76,392,556
West Midland	1891	132,002,537	41,659,134	10,214,748	23,955,865	207,832,284
	1890	131,682,712	42,095,103	10,164,925	22,666,507	206,609,545
Lake Ontario	1891	133,593,790	42,166,347	10,195,842	20,799,681	206,755,660
	1890	135,869,460	41,454,383	10,508,724	20,474,216	211,306,783
St. Lawrence and Ottawa	1891	104,043,863	34,443,701	9,744,170	18,837,837	167,069,571
	1890	103 794,410	34,491,377	9,418,689	18,029,706	165,734,182
East Midland	1891	38,939,990	11,451,224	3,278,159	6,790,044	60,459,417
	1890	39,462,646	11,493,877	3,384,004	6,432,464	60,772,991
Northern Districts	1891	6,160,316	1,704,271	587,782	1,561,792	10,014,161
	1890	5,880,781	1,617,104	562,266	1,265,041	9,325,192
The Province :						
1891		621,245,223	191,268,327	50,651,442	108,721,076	971,886,068
1890		622,886,060	193,438,826	50,515,583	104,086,626	970,927,035
1882-91		634,087,130	178,557,341	47,933,958	101,741,381	962,319,810

There is a falling off of $1,640,777 in the value of farm land of the province, and a drop of $2,170,499 in the value of buildings ; but these decreases are more than met by the rise of $135,859 in implements, and the addition of $4,634,450 in the worth of live stock, the result being that the total value of farm property is now $971,886,068, or $959,033 more than in 1890. Farm land has been lowered in value in the Lake Huron, Georgian Bay, Lake Ontario and East Midland Districts ; buildings have depreciated in value in the West Midland, Lake Ontario, St. Lawrence and Otttawa and East Midland groups ; implements are worth less than in the previous year in only two districts, the Lake Ontario and East Midland ; while the Lake Erie group alone has experienced a decline in the value of live stock. The only district falling behind its own record in the total value of farm property is the East Midland, where there was a falling off in the worth of e very item but live stock.

VALUE PER ACRE OCCUPIED. The value per acre occupied of the classes of farm property named below is shown by county groups and for the province for the years 1890 and 1891 :

Districts.	Farm land.		Buildings		Implements.		Live stock.		Total farm property.	
	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Lake Erie	38 08	37 40	11 04	10 87	2 96	2 90	5 90	5 92	57 98	57 09
Lake Huron	30 55	30 73	8 58	8 57	2 40	2 38	5 96	5 54	47 49	47 22
Georgian Bay	23 95	24 31	7 24	7 15	2 13	2 13	4 69	4 37	38 01	37 96
West Midland	40 59	40 52	12 81	12 95	3 14	3 13	7 37	6 97	63 91	63 57
Lake Ontario	43 90	44 63	13 85	14 60	3 35	3 45	6 83	6 72	67 93	69 40
St. Lawrence & Ottawa	19 60	19 68	6 49	6 54	1 84	1 79	3 55	3 42	31 48	31 43
East Midland	14 68	14 89	4 32	4 34	1 23	1 28	2 56	2 43	22 79	22 94
Northern Districts	3 72	3 73	1 03	1 02	0 35	0 36	0 94	0 80	6 04	5 91
The Province	27 57	27 79	8 49	8 63	2 25	2 25	4 82	4 64	43 13	43 31

Farm land has decreased in value in the province 22 cents per acre compared with the previous year, and buildings have also declined 14 cents per acre occupied. No change has occurred in the relative value of implements, while live stock has increased 18 cents per acre. The net result is that the total value of these four classes of farm property exhibits a decrease of 18 cents per acre occupied. The heaviest decline in the total value of farm property is observed in the Lake Ontario counties. The St. Lawrence and Ottawa and East Midland groups also reveal a decrease, but the other districts more than hold their own. Farm land shows an increase in two groups only, the Lake Erie and West Midland ; the groups are equally divided in the case of buildings, while every district excepting the Lake Erie group shows a gain in value of live stock per acre occupied.

The following table shows a comparison of the improvements on the land on a better basis. Here are indicated the values per acre of buildings, implements and live stock calculated on the cleared portion :

Farm property.	Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.		
									1891.	1890.	1882-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Buildings	18 22	14 41	13 73	18 00	18 28	14 70	13 57	10 33	16 21	16 76	16 14
Implements	4 88	4 03	4 03	4 41	4 42	4 16	3 88	3 50	4 29	4 50	4 33
Live stock	9 74	10 01	8 90	10 35	9 02	8 05	8 05	9 47	9 21	9 21	9 20
Total	32 84	28 45	26 66	32 76	31 72	26 91	25 50	23 30	29 71	30 47	29 67

The averages for the province for 1891 do not vary much from the averages derived for ten years, so that property exclusive of the land has kept pace with the area cleared.

MARKET PRICES. The following table is made up from market reports of newspapers published at fourteen market centres, the figures being taken during the period when each of the various articles of farm produce comprising the table is mainly marketed. The average price is also given for a series of years :

Markets.	Fall wheat, per bushel.	Spring wheat, per bushel.	Barley, per bushel.	Oats, per bushel.	Rye, per bushel.	Peas, per bushel.	Corn (in ear), per bushel.	Buckwheat, per bushel.	Beans, per bushel.	Potatoes, per bushel.	Carrots, per bushel.	Turnips, per bushel.	Hay, per ton.	Wool, per lb.
	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	$ c.	cts.
Belleville	98.4	98.4	49.3	36.8	80.8	64.5	....	49.8	.. ...	29.8	....	....	9 63	22.8
Brantford	92.2	91.0	47.5	33.5	76.5	62.6	29.8	45.0	.....	31.1	....	....	10 68	19.2
Brockville	104.5	104.5	63.6	36.6	52.1	60.3	....	43.3	.....	29.6	36.4	25.4	11 54	19.0
Chatham	91.1	90.8	39.8	30.5	....	55.8	23.1	....	95.2	39.0	....	....	9 71	21.0
Cobourg	91.3	90.5	45.1	28.1	79.8	60.7	....	47.0	.... .	27.2	....	....	14 50	....
Guelph	93.1	88.8	46.7	35.6	66.5	63.9	....	....	.....	30.3	....	....	11 50	19.2
Kingston	94.9	94.2	46.1	34.3	76.6	65.0	35.0	43.8	.....	28.3	....	....	9 30	16.8
Lindsay	94.2	90.1	42.6	32.8	67.8	59.7	....	45.0	.....	26.1	....	....	8 83	19.0
London	93.1	93.0	49.0	35.3	66.9	63.5	31.2	43.4	108.4	29.6	28.3	20.3	10 59	19.0
Ottawa	98.0	98.2	54.6	38.2	66.3	64.4	35.5	45.1	105.8	26.9	21.7	25.5	9 87	18.4
Peterborough	94.4	91.2	47.2	33.6	....	61.7	....	....	.....	42.5	....	....	.....	....
St. Thomas	92.0	.....	51.7	37.3	....	59.8	....	....	.....	32.1	....	....	9 80	19.4
Stratford	92.0	92.0	44.9	33.4	....	61.7	....	...	....	29.1	....	....	10 86	20.1
Toronto	96.6	91.9	49.5	38.9	82.4	66.1	....	....	.....	36 7	29.4	21.2	13 76	21.7
The Province..														
1891	95.1	92.9	49.1	36.5	72.3	63.8	31.1	44.1	106.1	32.6	28.9	21.2	11 91	19.4
1890	94.2	91.3	50.2	41.1	52.7	60.3	30.5	43.0	128.5	44.3	31.5	25.6	7 95	20 5
1889	88.4	88.1	44.0	30.5	50.9	55.7	25.9	39.5	126.7	45.5	27.3	22.8	9 98	20.7
1888	102.4	99.3	60.1	40.5	60.2	65.4	29.3	49.3	113.7	31.7	26.8	20.8	16 71	20.4
1887	78.4	78.0	56.7	34.6	49.5	55.9	28.7	45.0	97.9	62.8	28.0	29.5	11 62	22.1
1886	73.6	72.5	51 3	32.0	52.2	52.6	27.6	33.7	83.7	44.9	29.5	24.6	9 69	19 1
1885	81.5	80.6	55.2	31.5	55.2	58.0	27.9	39.2	80.0	41.1	32 5	23.6	9 85	17.4
1884	80.5	81.4	53 6	33.1	59.7	64.4	....	....	.....	....	....	....	.....	....
1883	105.0	107.0	57.0	38.0	62.0	71.0	....	....	.....	....	....	....	.....	....
1882	101.0	106.0	65.0	43.0	64.0	74.0	....	....	.....	....	....	....	.....	....
1885-91	87.2	85.8	52.4	35.3	56.1	59.0	29.1	41.8	106 8	41.1	26.8	21.2	10 59	19.8
1882-91	90.0	89.6	54.5	36.0	60.0	61.6	....	....	.....	....	....	....	.... .	....

Fall wheat, spring wheat, rye, peas, corn, buckwheat and hay and clover each average higher figures for the province than in the previous year or for the series of years, the other seven items of the table falling below their respective market values in 1890, although both oats and carrots more than equal their own averages for the periods recorded. Fall and spring wheats are much higher than their averages for the years 1882-91, although both of these crops were surpassed in price in three years out of the ten. On the other hand, barley is lower in value than in any year excepting 1889, when the quality was rated as very poor on account of the great discoloration. Hay and clover have not realised such prices since 1888, when the figures mounted to $16.71.

VALUE OF CROPS. The following table gives the value of each crop, based upon market prices, for each of the five years 1887–91, together with the averages for the seven years 1885–91 and the ten years 1882–91. No record was kept of the

bracketed items prior to 1885, and so their averages for the seven years are added to those of the other items for 1882–91, in order to give the nearest approximate average for the ong term :

Crops.	1891.	1890.	1889.	1888.	1887.	Average. 1885-91.	Average 1882-91.
	$	$	$	$	$	$	$
Fall wheat	20,800,736	13,439,875	11,493,648	14,162,726	11,321,439	14,574,798	16,250,884
Spring wheat ...	9,951,019	7,015,465	5,019,680	6,408,384	4,393,831	6,721,136	7,959,306
Barley	7,925,675	7,831,285	10,290,011	14,043,308	9,715,448	9,848,867	10,547,091
Oats	27,378,483	21,687,734	19,625,622	26,514,099	17,247,443	21,231,964	21,017,492
Rye.	820,337	823,883	728,725	779,772	442,969	696,447	1,010,057
Peas	11,690,367	9,279,756	7,524,645	9,332,490	6,804,892	8,742,106	8,573,501
Corn	5,687,773	4,273,410	2,395,283	5,108,976	2,412,164	3,693,817	
Buckwheat	1,150,191	883,100	502,668	602,585	461,409	680,815	
Beans	816,546	978,323	471,188	607,756	270,180	563,534	
Hay	28,498,224	34,232,024	37,208,564	33,570,674	35,947,748	32,929,592	55,887,429
Potatoes	7,842,219	7,779,575	6,531,766	7,060,733	6,705,784	7,396,869	
Carrots	476,752	1,326,321	936,925	1,044,820	589,592	932,768	
Turnips	6,885,345	12,042,384	8,440,847	9,909,169	9,266,970	9,690,034	
Totals.....	129,923,667	121,593,075	111,169,572	129,145,492	105,579,869	117,702,747	121,245,760

Price, acreage and yield combine to make the figures for the above table. The aggregate value of these thirteen staple crops is $129,923,667, being $8,330,592 more than in the previous year, and exceeding by $778,175 the unusually high showing of 1888. Rye, beans, hay, carrots and turnips each show a falling off, the drop in the value of hay being particularly heavy. Fall wheat, on the contrary, made a tremendous leap upward in total value, and spring wheat, oats and peas also experienced a marked rise. For the values of carrots and turnips we have not this year followed the market quotations, as these evidently refer to garden produce. It is believed that the estimates of 10 cents per bushel for turnips and 12½ cents for carrots are nearer the mark.

Crop Values by County Groups. The total value of the field crops named in the preceding table is here presented by county groups and for the province for each of the five years 1887–91, together with the average for the two series of years 1885–91 and 1882–91 :

Districts.	1891.	1890.	1889.	1888.	1887.	Average 1885-91.	Average 1882-91.
	$	$	$	$	$	$	$
Lake Erie.....	17,046,233	14,791,696	12,926,470	17,889,286	12,080,651	14,744,989	14,806,892
Lake Huron.....	14,242,846	13,634,099	11,009,721	14,303,010	11,936,938	12,794,711	13,076,459
Georgian Bay....	11,511,751	11,465,081	10,391,701	10,969,814	9,447,927	10,437,119	10,896,155
West Midland...	28,682,499	27,655,714	22,006,961	29,217,226	22,805,391	25,534,923	26,171,684
Lake Ontario....	27,163,650	25,675,054	25,342,044	27,908,395	22,386,070	25,506,235	26,501,150
St. L'w. & Ottawa	21,811,942	18,660,552	19,928,380	20,171,732	18,975,474	19,735,629	20,411,430
East Midland....	7,814,352	7,847,766	8,089,324	7,213,525	6,459,491	7,477,456	7,886,781
North'n Districts	1,650,394	1,863,113	1,474,971	1,472,504	1,487,927	1,471,685	1,495,203
The Province.	129,923,667	121,593,075	111,169,572	129,145,492	105,579,869	117,702,747	121,245,760

The East Midland counties and the Northern Districts are the only groups falling below their record of the previous year, and the first named group is the only one that has not reached its own average for the ten years. The West Midland group again leads in the total value of field crops, the Lake Ontario counties pressing closely for second place, although still showing the highest average for the period 1882–91.

VALUE OF PRODUCE PER ACRE UNDER CROP. The table following shows the value per acre raised of each of the staple field crops by county groups and for the province, for 1890 and 1891, together with the averages for 1885–91 and 1882–91. The average value of all crops is also given for the same periods:

Crops.	Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.			
									1891.	1890.	1885-91.	1882-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Fall wheat	24 43	25 47	23 64	26 76	22 22	16 70	17 79	22 11	24 47	18 66	17 36	18 00
Spring wheat .	15 36	19 28	18 24	20 45	19 30	21 92	17 26	18 67	19 49	11 66	12 58	14 12
Barley	12 46	14 26	14 48	15 18	14 12	14 77	13 92	12 34	14 33	11 17	13 45	14 19
Oats	13 92	14 74	13 89	16 09	15 44	14 97	13 21	11 12	14 87	11 52	12 04	12 64
Rye	12 59	13 60	13 41	13 94	10 74	13 14	11 28	14 14	12 09	7 99	8 71	9 75
Peas	12 68	16 86	16 08	16 53	14 87	15 87	15 02	15 60	15 54	11 88	12 20	12 82
Corn	23 68	23 82	17 09	25 34	22 55	24 17	20 73	14 77	23 59	19 09	18 97	
Buckwheat	11 13	11 27	8 36	10 06	10 41	11 25	9 62	10 89	10 66	9 80	9 37	
Beans	18 89	21 85	23 44	20 96	21 75	24 12	19 58	21 63	19 70	24 80	20 61	
Hay	11 91	10 55	11 33	13 61	11 50	10 39	8 05	7 72	11 18	13 90	13 94	19 09
Potatoes	38 77	51 38	50 68	51 50	44 98	52 51	46 60	57 86	48 95	49 21	48 93	
Carrots	45 82	48 65	47 66	58 04	46 86	45 38	43 51	40 32	48 36	110 74	90 66	
Turnips	44 37	54 77	56 55	60 39	53 26	47 46	45 80	36 46	54 61	108 44	88 32	
All crops:												
1891.....	17 25	16 93	16 55	19 17	16 66	14 93	13 71	12 93	16 63	.....	.....	.....
1890.....	14 86	16 07	16 49	18 07	15 44	12 68	13 84	15 21	.....	15 42	.....	.....
1885-91.....	15 48	15 92	15 37	17 28	15 67	13 92	13 35	15 32	....	.....	15 46	.....
1882-91.....	15 76	16 43	16 11	17 90	16 36	14 35	13 99	15 85	.....	.....	.....	16 01

The average value per acre of all crops for the province is $16.63, which is an increase of $1.21 over the figures of the preceding year, and 62 cents more than the average for the ten years. The East Midland counties and the Northern Districts are the only groups which fail to reach their total values of the previous year. The West Midland counties show the best return per acre for all groups, and the Northern Districts the poorest. Fall wheat averages $24.47 per acre for the province, compared with $18.66 in the preceding year, and an average of $18 for the years 1882–91. All the other cereals make a good showing compared with 1890, and the two series of years. Beans, hay, potatoes, carrots and turnips, however, are below their respective figures of 1890, although potatoes slightly exceed their average for the seven years 1885–91. The best values for the various crops are found in the following groups: Fall wheat $26.76, barley $15.18, oats $16.09, corn $25.34, carrots $58.04, turnips $60.39, in the West Midland; peas $16.86, buckwheat $11.27, in the Lake Huron; spring wheat $21.92, beans $24.12, in the St. Lawrence and Ottawa; hay $11.91 in the Lake Erie; rye $14.14 and potatoes $57.86 in the Northern Districts.

Per cent. Ratios of Values per Acre. The table following, by means of per cent. ratios, compares the values per acre of the various crops with their respective averages for the ten years 1882–91, by county groups and for the province :

Districts.	Fall wheat.	Spring wheat.	Barley.	Oats.	Rye.	Peas.	Corn.	Buckwheat.	Beans.	Hay.	Potatoes.	Carrots.	Turnips.	All field crops.
Lake Erie	142	120	93	108	138	112	120	127	94	80	103	58	59	109
Lake Huron	142	153	98	115	129	123	126	137	106	74	106	53	61	103
Georgian Bay	126	136	104	116	125	119	110	113	110	86	90	50	64	103
West Midland	145	150	98	117	142	123	132	125	100	85	107	60	66	107
Lake Ontario	122	131	99	117	121	119	129	110	102	84	99	47	58	102
St. Lawrence and Ottawa	100	147	111	127	121	128	129	115	101	77	101	59	63	104
East Midland	101	129	106	117	121	125	130	105	96	70	90	49	60	98
Northern Districts	121	111	97	100	122	109	119	106	96	64	89	62	54	81
The Province	136	138	101	118	124	121	124	112	96	80	100	53	62	104

" Lake Erie, fall wheat, 142 " means that the crop was 42 per cent. above the average ; and " Lake Erie, beans, 94," means that the crop was 6 per cent. below the average for the ten years 1882-91. The per cent. ratio of value of all crops per acre is 104 for the province, although the East Midland group and the Northern Districts do not reach 100.

Rentals of Leased Farms. The appended table presents by districts the average value and rental of such leased farms as were reported on farmers' schedules returned to this Bureau in 1891. The rental per acre is given on the bases of land occupied and land cleared for 1890 and 1891 and the average for the six years, 1886-91 ; also, the per cent. ratio that the rental bears to the value of land and buildings on the farm :

Leased farms.	Lake Erie.	Lake Huron.	Georgian Bay.	West Midland.	Lake Ontario.	St. Lawrence and Ottawa.	East Midland.	Northern Districts.	The Province.
Average value :	$	$	$	$	$	$	$	$	$
Land	4,782	4,439	3,824	5,707	5,525	4,206	3,900	1,258	4,771
Buildings	1,542	1,278	1,226	1,760	1,722	1,450	1,371	461	1,507
Average rental	258	247	217	314	316	199	240	86	264
Rent per acre based on									
Acres occupied — 1891	2.28	1.97	1.56	2.36	2.56	1.27	1.46	0.41	1.95
Acres occupied — 1890	2.11	1.88	1.59	2.23	2.57	1.36	1.51	0.41	1.98
Acres occupied — 1886-91	2.13	1.92	1.56	2.30	2.68	1.34	1.56	0.44	2.01
Acres cleared — 1891	2.96	2 55	2.20	2.95	3.10	2.00	2.33	1.69	2.70
Acres cleared — 1890	2.89	2.44	2.16	2.90	3.18	2.09	2.45	1.70	2.72
Acres cleared — 1886-91	2.93	2.62	2.22	2.99	3.27	2.16	2.51	1.74	2.81
Per cent. ratio of rental to value of farm — 1891	4.08	4.32	4.29	4.21	4.36	3.52	4.55	5.00	4.20
Per cent. ratio of rental to value of farm — 1886-91	4.00	4.14	4.25	4.15	4.41	3.81	4.44	4.82	4.19

These figures are compiled from returns of 1,399 leaseholders. The size of the leased farm is larger than the average of previous years. The rent per acre is lower than the average of six years and the value of land and buildings shows almost the ratio to the rental as the average for the same period.

FARM LABOR AND WAGES.

The following paragraph was contained in the May bulletin: "There appears to be a sufficient number of farm laborers in most quarters, although some correspondents in Bruce, Grey, Wellington, Oxford and Lennox speak of a scarcity in their immediate neighborhoods. First-class men, however, more especially good plowmen, are not readily found. While a few reports speak in favorable terms of the lads sent out by the various 'Homes,' some of our correspondents allude to 'immigrant trash' and 'time-killing farm pupils.' It would seem that 'going west,' sailing or lumbering are more popular with the native youth of our townships than hiring out on the farm."

The August bulletin had the following: "There has been a sufficiency of labor during harvesting, chiefly because farmers are endeavoring to do as much work as possible within their own families. Occasional reports only were made of a scarcity of laborers. There has been no appreciable change in the rate of wages during the summer, but prices vary greatly according to locality and the rates of wages paid laborers in other branches of work."

The November reports were thus summarised: "The supply of skilled farm hands during the year has been, in most instances, about equal to the demand, with a tendency perhaps towards scarcity. While the demand, for various reasons, tends to decrease from year to year, the indications are that the supply is decreasing even more rapidly. The reason for this scarcity appears to be that numbers of young men are continually going west and south or drifting away from the farm altogether. While this state of things would seem to indicate an increase in wages, it is doubtful whether farmers will be able to pay much more for their help than they are doing. There is also a growing tendency towards greater economy of labor in every direction, and it is probable that the rate of wages will remain about the same for the present. Domestic servants are as scarce as ever."

Wages of Farm Laborers. The table following gives the average rates of wages of farm laborers by the year and by the month, with and without board, by county groups and for the province, for the years 1890 and 1891, together with the averages for the ten years, 1882-91; also the amounts paid domestic servants in 1890 and 1891:

Districts.	Farm laborers.												Domestics per month with board.	
	Per year.						Per month in working season.							
	With board.			Without board.			With board.			Without board.				
	1891	1890	82-91	1891	1890	82-91	1891	1890	82-91	1891	1890	82-91	1891	1890
	$	$	$	$	$	$	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Lake Erie.....	158	154	159	253	247	249	16 66	16 65	17 34	25 29	25 94	26 23	6 39	6 40
Lake Huron	159	155	162	260	256	258	17 13	16 72	17 88	26 28	27 04	27 36	6 30	6 18
Georgian Bay.....	153	156	159	262	257	256	17 34	16 73	17 79	26 86	26 23	27 34	5 97	5 77
West Midland....	157	157	161	250	251	251	16 43	16 54	17 45	25 40	26 24	26 58	6 46	6 36
Lake Ontario.....	162	159	163	262	254	254	16 76	16 87	17 49	25 90	26 34	26 61	6 50	6 42
St. Law. & Ottawa	154	159	161	254	253	252	15 99	17 17	17 88	25 20	26 86	26 79	5 76	6 00
East Midland.....	166	160	165	258	258	257	15 82	16 77	17 64	25 78	25 68	26 89	5 90	5 93
Northern Districts	169	174	173	273	280	276	18 19	19 74	19 58	27 12	29 59	29 39	6 13	6 40
The Province	158	157	162	257	253	253	16 66	16 88	17 62	25 81	26 56	26 91	6 25	6 23

For the province the yearly rate of wages, with board, was $158, being $1 more than in 1890, but $4 less than the average of the ten years, 1882-91. The average rate, without board, for the province was $257, being an increase of $4 over the amount paid in the previous year (which was the same as the average for the ten years). The highest yearly wages for agricultural laborers prevailed in the Northern Districts and the East Midland group. For the province monthly wages, with board, averaged $16.66, being a lowering of 22 cents compared with the previous year, and 92 cents below the average of the ten years period. The rate of wages, without board, dropped from $26.56 in the previous year to $25 81, which is $1.10 lower than the average for the ten years. For this class of workers the highest rates obtained in the Northern Districts and the Georgian Bay counties. The average amount per month given to domestic servants on the farm was $6 25, being an advance of 2 cents on the figures shown for 1890. In four out of the eight groups, however, a decrease is noted in the average rate of wages paid to this class.

In some cases the wages of experienced married men are supplemented as indicated by the following quotation from a correspondent in the County of Brant:

"My hired men by the year get $220 in cash, with cow and feed the same as my own, fuel, garden ground for potatoes and team to work the same and good, comfortable four and five-roomed house. Summed up this amounts to one dollar a day, working days.

STATISTICS OF

VALUES, RENT AND FARM WAGES

FARM VALUES—LAND, BUILDINGS AND IMPLEMENTS.

TABLE I. Showing by County Municipalities and groups of Counties the values of Farm Land, Buildings and Implements in Ontario in 1890 and 1891.

Counties.	Farm lands.		Farm buildings.		Farm implements.	
	1891.	1890.	1891.	1890.	1891.	1890.
	$	$	$	$	$	$
Essex	16,954,141	16,585,081	4,407,901	4,226,122	1,197,532	1,234,940
Kent	23,908,174	23,777,291	5,910,490	5,503,006	1,588,136	1,555.151
Elgin	17,367,543	17,489,547	4,804,818	5,005,478	1,274,912	1,207.841
Norfolk	12,284,429	11,713,740	4,054,815	4,110,525	1,085,988	1,048.016
Haldimand	9,583,866	9,358,909	3,532,124	3,451,788	1,010,761	950,757
Welland	8,603,126	8,428,307	3,003,576	3,102,447	726,623	788,088
Totals	88,701,279	87,352,875	25,713,724	25,399,366	6,883,952	6,784,793
Lambton	19,684,305	20,022,595	4,776,311	4,962,205	1,464,439	1,377,776
Huron	29,524,668	29,513,722	8,503,549	8,617,158	2,208,964	2,354,921
Bruce	20,222,039	20,375,754	6,219,530	5,915,781	1,780,930	1,674,400
Totals	69,431,012	69,912,071	19,499,390	19,495,144	5,454,333	5,407,097
Grey	22,669,806	22,262,173	7,292,716	7,041,914	2 227,473	2,126,990
Simcoe	25,702,630	26,668,872	7,337,820	7,350,258	2,064,983	2,158,097
Totals	48,372,436	48,931,045	14,630,536	14,392,172	4,292,456	4,285,087
Middlesex	33,509,147	34,925,968	9,689,282	10,231,305	2,303,340	2.505,058
Oxford	22,367,553	22,356,395	7,217,958	7,334,038	1,729,353	1,577,461
Brant	10,418,317	10,253,987	3,721,721	3,837,380	861,183	813,005
Perth	20,965,735	20,184,159	6,475.137	6,513,584	1,710,217	1,711,863
Wellington	21,094,527	21,120,421	7,161,625	6,859,654	1,718,924	1,679.613
Waterloo	14,433,910	13,696,727	4,948,466	4,846,400	1,158,520	1,150,671
Dufferin	9,213,348	9,145,055	2,444,945	2,473,042	733,211	727,252
Totals	132,002,537	131,682,712	41,659,134	42,095,403	10,214,748	10,164,923
Lincoln	9,418,870	8,938,290	3,602,775	3,453,792	815,109	741,425
Wentworth	13,456,318	13,625,007	4.674,982	4,695,485	1,110,255	1,104,829
Halton	10,137,179	9,989,717	3,420,117	3,445,730	790,572	783,141
Peel	13,521,360	13,878,876	4,094,271	4,549,242	1 081,053	1,041,939
York	31,096,807	31,930.300	8,388,005	9,111,861	1,927,807	2,019,768
Ontario	19,251,022	19,404,819	5,824,528	6,223,752	1,456,725	1,533,199
Durham	14,304,217	15,043,081	4,381,328	4,854,750	1,094,182	1,095,288
Northumberland	14,090,305	14,334,306	4,749,325	5,149,288	1,156,755	1,346,999
Prince Edward	8,317,712	8,725,064	3,031,016	2,970,483	763,384	842,136
Totals	133,593,790	135,869,460	42,166,347	44,454,383	10,195,842	10,508,724
Lennox and Addington	8,415,192	9,455,784	3,300,385	2,998,745	759,087	777,704
Frontenac	8,496,832	8,486,769	2,878,080	3,018,113	860,393	751,002
Leeds and Grenville	18,891,530	18,565,738	6,482,460	7,026,849	1,637,614	1,691,578
Dundas	8,546,250	7,783.443	2,587,442	2,649.191	756,900	690,360
Stormont	6,496,712	5,820,418	2,372,064	2,133.567	583,694	567,921
Glengarry	6,864.460	7,109,229	2,496,503	2,551,557	765,738	760,977
Prescott	6,494,605	7,074,698	2,228,556	1.969,640	630,323	591,081
Russell	4,380,554	4,298,201	1,223,292	1,165,330	396,449	448,044
Carleton	19,244,547	18,178,141	4,683,507	5,030,330	1,447,062	1,304,938
Renfrew	7,556,878	7,316,604	2,955,933	2,464,751	956,988	907,811
Lanark	8,656,303	9,705,385	3,235,479	3,483,304	949,922	927,273
Totals	104,043,863	103,794,410	34,443,701	34,491,377	9,744,170	9,418,689
Victoria	12,143,774	12,077,621	3,272,778	3,269,940	951,221	1,026,237
Peterborough	10,041,203	10,638,657	3,164,673	3,027,443	847,351	797,050
Haliburton	1,088,740	992,536	303,233	269.547	96,700	81,341
Hastings	15,666,273	15,753,832	4,710,540	4,926,947	1,382,887	1,479,376
Totals	38,939,990	39,462,646	11,451,224	11,493,877	3,278,159	3,384,0 4
Muskoka	1,912,181	2,119,171	639,047	623,276	211,759	195,439
Parry Sound	1,710,646	1,476,517	460,110	340,409	153,026	133,301
Nipissing	468,111	436.670	123,030	104,050	36,990	27,947
Algoma	2,069,378	1,848,423	482,084	549,369	186,007	205,579
Totals	6,160,316	5,880,781	1,704,271	1,617,104	587,782	562,266
The Province	621,245,223	622,886,000	191,268,327	193,438,826	50,651,442	50,515,583

FARM VALUES—LIVE STOCK AND TOTAL PROPERTY—RENTALS.

TABLE II. Showing by County Municipalities and groups of Counties the values of Farm Live Stock and total Farm Property in Ontario in 1890 and 1891; also the rent per acre of leased farms as reported in 1891, with the averages derived for the six years 1886-91.

Counties.	Farm live stock.		Total farm property.		Rent per acre on land.			
					Occupied.		Cleared.	
	1891.	1890.	1891.	1890.	1891.	'86-91.	1891.	'86-91.
	$	$	$	$	$ c.	$ c.	$ c.	$ c.
Essex	2,463,617	2,522,114	25,023,191	24,568,257	2 69	2 00	3 60	2 78
Kent	3,430,057	3,492,894	34,836,857	34,328,342	2 65	2 58	3 79	3 65
Elgin	2,794,325	2,856,740	26,241,598	26,559,606	2 38	2 22	3 21	3 08
Norfolk	1,954,512	1,791,306	19,379,744	18,663,587	1 97	1 84	2 56	2 53
Haldimand	1,761,978	1,763,491	15,888,729	15,524,945	1 99	1 85	2 39	2 37
Welland	1,347,071	1,395,900	13,680,396	13,714,742	2 02	2 01	2 27	2 50
Totals	13,751,560	13,822,445	135,050,515	133,359,479	2 28	2 13	2 96	2 93
Lambton	3,200,778	3,127,010	29,125,833	29,189,586	2 04	1 88	2 78	2 82
Huron	6,039,054	5,572,443	46,276,235	46,058,244	2 16	2 13	2 73	2 76
Bruce	4,309,153	3,912,542	32,531,652	31,878,477	1 70	1 71	2 20	2 34
Totals	13,548,985	12,611,995	107,933,720	107,426,307	1 97	1 92	2 55	2 62
Grey	5,189,055	4,796,716	37,379,050	36,227,793	1 31	1 30	1 87	1 91
Simcoe	4,286,257	3,987,536	39,391,690	40,164,763	1 85	1 88	2 53	2 58
Totals	9,475,312	8,784,252	76,770,740	76,392,556	1 56	1 56	2 20	2 22
Middlesex	6,303,952	6,015,884	51,805,721	53,678,215	2 46	2 54	3 09	3 34
Oxford	3,916,109	3,802,970	35,230,975	35,070,864	2 71	2 70	3 47	3 51
Brant	1,570,649	1,579,562	16,571,870	16,483,934	2 89	2 77	3 39	3 37
Perth	3,996,570	3,744,405	33,147,659	32,154,011	2 23	2 32	2 87	2 94
Wellington	4,248,985	3,896,118	34,224,061	33,555,806	2 12	2 00	2 64	2 57
Waterloo	2,263,608	2,085,930	22,804,504	21,779,728	2 10	2 24	2 62	2 83
Dufferin	1,655,992	1,541,638	14,047,496	13,886,987	1 56	1 49	2 02	2 20
Totals	23,955,865	22,666,507	207,832,284	206,609,545	2 36	2 30	2 95	2 99
Lincoln	1,402,369	1,291,989	15,239,123	14,425,496	2 45	2 36	3 08	2 88
Wentworth	2,095,226	2,066,779	21,336,781	21,492,100	2 97	2 70	3 76	3 41
Halton	1,492,331	1,574,947	15,840,199	15,793,535	2 38	2 32	2 83	2 94
Peel	2,144,128	1,952,499	20,840,812	21,422,556	2 61	2 71	3 24	3 29
York	3,931,303	4,251,109	45,343,922	47,313,038	3 26	3 12	3 88	3 78
Ontario	3,575,304	3,446,651	30,107,579	30,608,421	2 67	2 80	3 24	3 46
Durham	2,268,398	2,222,885	22,048,125	23,216,004	2 33	2 84	2 81	3 41
Northumberland	2,487,156	2,302,157	22,483,541	23,132,750	1 82	2 07	2 25	2 55
Prince Edward	1,403,466	1,365,200	13,515,578	13,902,883	1 96	2 16	2 26	2 79
Totals	20,799,681	20,474,216	206,755,660	211,306,783	2 56	2 68	3 10	3 27
Lennox and Addington	1,633,498	1,415,328	14,108,162	14,647,561	1 36	1 57	2 05	2 32
Frontenac	1,583,605	1,556,158	13,818,910	13,812,042	1 09	1 24	1 62	1 93
Leeds and Grenville	3,362,963	3,274,861	30,374,567	30,559,026	1 38	1 39	2 02	2 17
Dundas	1,272,917	1,170,348	13,163,509	12,293,342	1 46	1 69	2 03	2 56
Stormont	1,143,149	1,069,731	10,595,619	9,591,637	1 70	1 50	2 39	2 24
Glengarry	1,311,306	1,313,884	11,438,007	11,735,647	1 53	1 41	2 51	2 34
Prescott	1,112,521	1,089,364	10,466,005	10,724,783	1 72	1 58	2 41	2 26
Russell	820,016	771,052	6,820,311	6,682,627	1 13	1 27	1 91	2 20
Carleton	2,396,921	2,460,954	27,772,037	26,974,363	1 67	1 80	2 17	2 57
Renfrew	2,197,568	2,108,768	13,667,367	12,797,934	0 68	0 76	1 16	1 66
Lanark	2,003,373	1,799,258	14,845,077	15,915,220	0 88	0 83	1 54	1 39
Totals	18,837,837	18,029,706	167,069,571	165,734,182	1 27	1 34	2 00	2 16
Victoria	2,064,985	1,924,849	18,432,758	18,298,647	1 57	1 86	2 37	2 77
Peterborough	1,734,941	1,561,176	15,788,168	16,024,326	1 06	1 25	1 74	2 05
Haliburton	288,167	243,032	1,776,840	1,586,456	0 44	0 34	1 87	1 50
Hastings	2,701,951	2,703,407	24,461,651	24,863,562	1 90	1 81	2 69	2 69
Totals	6,790,044	6,432,464	60,459,417	60,772,991	1 46	1 56	2 33	2 51
Muskoka	518,378	457,215	3,281,365	3,395,101	0 30	0 33	1 56	1 64
Parry Sound	433,192	323,189	2,756,974	2,273,416	0 43	0 46	1 56	1 80
Nipissing	106,110	77,892	734,241	646,559	0 25	0 40	1 98	2 07
Algoma	504,112	406,745	3,241,581	3,010,116	0 53	0 60	1 56	1 69
Totals	1,561,792	1,265,041	10,014,161	9,325,192	0 41	0 44	1 69	1 74
The Province	108,721,076	104,086,626	971,886,068	970,927,035	1 95	2 01	2 70	2 81

FARM VALUES—AVERAGE PER ACRE.

TABLE III. Showing by County Municipalities and groups of Counties the average value per acre occupied of Farm Land, Buildings, Implements and Live Stock in Ontario for the years 1890 and 1891.

Counties.	Lands.		Buildings.		Implements.		Live stock.		Total property.	
	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	39 78	38 56	10 34	9 82	2 81	2 87	5 78	5 86	58 71	57 11
Kent	42 14	42 19	10 42	9 76	2 80	2 76	6 04	6 20	61 40	60 91
Elgin	39 81	39 97	11 01	11 44	2 92	2 76	6 40	6 53	60 14	60 70
Norfolk	31 34	29 49	10 34	10 35	2 77	2 64	4 98	4 51	49 43	46 99
Haldimand	34 23	33 40	12 61	12 32	3 61	3 39	6 29	6 30	56 74	55 41
Welland	37 84	37 11	13 21	13 66	3 20	3 47	5 92	6 14	60 17	60 38
Group	38 08	37 40	11 04	10 87	2 96	2 90	5 90	5 92	57 98	57 09
Lambton	29 78	30 35	7 23	7 52	2 21	2 09	4 84	4 74	44 06	44 70
Huron	37 13	36 94	10 69	10 79	2 78	2 95	7 59	6 97	58 19	57 65
Bruce	24 76	25 05	7 62	7 27	2 18	2 06	5 28	4 81	39 84	39 19
Group	30 55	30 73	8 58	8 57	2 40	2 38	5 96	5 54	47 49	47 22
Grey	21 42	21 02	6 89	6 65	2 11	2 01	4 90	4 53	35 32	34 21
Simcoe	26 73	27 97	7 63	7 71	2 15	2 26	4 46	4 18	40 97	42 12
Group	23 95	24 31	7 24	7 15	2 13	2 13	4 69	4 37	38 01	37 96
Middlesex	44 19	46 15	12 78	13 52	3 04	3 31	8 31	7 95	68 32	70 93
Oxford	47 39	47 41	15 29	15 55	3 67	3 35	8 30	8 06	74 65	74 37
Brant	48 16	47 46	17 21	17 76	3 98	3 77	7 26	7 31	76 61	76 30
Perth	40 66	38 98	12 56	12 58	3 31	3 30	7 75	7 23	64 28	62 09
Wellington	33 65	33 66	11 42	10 93	2 74	2 68	6 78	6 21	54 59	53 48
Waterloo	47 02	44 75	16 12	15 84	3 77	3 76	7 38	6 82	74 29	71 17
Dufferin	25 90	25 79	6 87	6 98	2 06	2 05	4 65	4 35	39 48	39 17
Group	40 59	40 52	12 81	12 95	3 14	3 13	7 37	6 97	63 91	63 57
Lincoln	49 37	46 66	18 88	18 03	4 27	3 87	7 35	6 74	79 87	75 30
Wentworth	49 25	49 83	17 11	17 17	4 06	4 04	7 67	7 56	78 09	78 60
Halton	45 30	44 65	15 28	15 40	3 53	3 50	6 67	7 04	70 78	70 59
Peel	46 96	48 16	14 22	15 78	3 76	3 62	7 45	6 77	72 39	74 33
York	58 27	59 73	15 72	17 04	3 61	3 78	7 37	7 95	84 97	88 50
Ontario	38 37	38 91	11 61	12 48	2 90	3 07	7 13	6 91	60 01	61 37
Durham	38 85	40 80	11 90	13 16	2 97	2 97	6 16	6 03	59 88	62 96
Northumberland	32 47	33 04	10 94	11 87	2 66	3 10	5 73	5 31	51 80	53 32
Prince Edward	36 12	37 67	13 16	12 82	3 32	3 64	6 10	5 89	58 70	60 02
Group	43 90	44 63	13 85	14 60	3 35	3 45	6 83	6 72	67 93	69 40
Lennox and Addington	19 97	22 79	7 83	7 23	1 80	1 88	3 88	3 41	33 48	35 31
Frontenac	12 60	12 51	4 27	4 45	1 28	1 11	2 35	2 29	20 50	20 36
Leeds and Grenville	25 25	25 07	8 67	9 49	2 19	2 28	4 49	4 42	40 60	41 26
Dundas	36 15	32 83	10 94	11 18	3 20	2 91	5 38	4 94	55 67	51 86
Stormont	25 61	23 14	9 35	8 48	2 30	2 26	4 51	4 25	41 77	38 13
Glengarry	23 76	24 74	8 64	8 88	2 65	2 65	4 54	4 57	39 59	40 84
Prescott	22 77	24 78	7 82	6 90	2 21	2 07	3 90	3 81	36 70	37 56
Russell	17 32	17 02	4 84	4 61	1 57	1 78	3 24	3 05	26 97	26 46
Carleton	34 25	32 36	8 34	8 95	2 57	2 32	4 27	4 38	49 43	48 01
Renfrew	8 26	8 18	3 23	2 76	1 04	1 01	2 40	2 36	14 93	14 31
Lanark	12 91	14 50	4 83	5 20	1 42	1 39	2 99	2 69	22 15	23 78
Group	19 60	19 68	6 49	6 54	1 84	1 79	3 55	3 42	31 48	31 43
Victoria	21 25	21 16	5 73	5 73	1 66	1 80	3 61	3 37	32 25	32 06
Peterborough	18 71	19 66	5 89	5 60	1 58	1 47	3 23	2 89	29 41	29 62
Haliburton	1 93	1 77	0 54	0 48	0 17	0 14	0 51	0 43	3 15	2 82
Hastings	15 97	16 15	4 80	5 05	1 41	1 52	2 76	2 77	24 94	25 49
Group	14 68	14 89	4 32	4 34	1 23	1 28	2 56	2 43	22 79	22 94
Muskoka	3 72	4 11	1 24	1 21	0 41	0 38	1 01	0 89	6 38	6 59
Parry Sound	3 36	3 24	0 90	0 75	0 30	0 29	0 85	0 71	5 41	4 99
Nipissing	2 68	3 05	0 70	0 73	0 21	0 19	0 61	0 54	4 20	4 51
Algoma	4 49	4 22	1 05	1 25	0 40	0 47	1 09	0 93	7 03	6 87
Group	3 72	3 73	1 03	1 02	0 35	0 36	0 94	0 80	6 04	5 91
The Province	27 57	27 79	8 49	8 63	2 25	2 25	4 82	4 64	43 13	43 31

MARKET PRICES.

TABLE No. IV. Showing the average price of Agricultural Products at the leading markets of Ontario for July—December, 1891, and the average for the half year and for the Province.

Products.	Belleville.	Brantford.	Brockville.	Chatham.	Coboung.	Guelph.	Kingston.	Lindsay.	London.	Ottawa.	Peterborough.	St. Thomas.	Stratford.	Toronto,	The Province.
FALL WHEAT: per bush.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.
July	107.7	92.3	101.9	92.5	.....	101.2	102.5	102.5	97.0	103.1	97.5	97.6	97.3	108.4	102.8
August	107.5	91.0	105.0	90.8	....	92.5	100.0	100.0	91.9	98.2	95.5	91.2	93.3	94.6	94.7
September ..	95.0	93.8	105.0	92.4	94.5	93.3	93.8	91.9	95.7	97.1	95.0	93.1	95.1	96.4	95.5
October	96.2	91.7	105.0	91.7	90.0	89.0	90.2	89.1	91.4	92.5	91.0	89.3	88 5	93.5	92.3
November ..	.....	93.0	105.0	90.7	90.7	90.5	88.1	92.3	93.3	97.5	95.0	90.3	90.6	94.1	93.4
December	92.0	90.8	105.0	89.8	91.0	90.6	90.6	89.9	89.0	95.8	94.4	88.4	87.6	91.9	91.4
Average....	98.4	92.2	104.5	91.1	91.3	93.1	94.9	94.2	93.1	98.0	94.4	92 0	92.0	96.6	95 1
SPRING WHEAT: per bush.															
July	107.7	87.5	101.9	87.5	.....	96.2	100.8	95.0	96.8	101.4	93.3	.....	97.3	98.7	98.3
August	107.5	91.3	105.0	.....	.....	90.0	100.1	90.0	92.0	99.3	89.0	.....	93.3	94.6	94.8
September ..	95.0	92.5	105.0	92.5	91.7	88.3	94.4	89.8	95.7	97.1	92.0	.....	95.1	89.5	92 5
October ...	96.2	91.7	105.0	92.5	89 6	84.0	88.4	87.7	91 1	94.6	88.6	.....	88.5	89.3	90.3
November	.....	91.0	105.0	90.5	90.7	86.5	88.1	90.5	93.2	97.5	92.5	.....	91 1	91.6	92.3
December	92.0	90.8	105.0	.....	91.0	86.8	89.4	87.6	88.8	95.8	91.4	.....	87.6	88.9	89.9
Average....	98.4	91.0	104.5	90.8	90.5	88.8	94.2	90.1	93.0	98.2	91.2	.....	92.0	91.9	92.9
BARLEY: per bush															
July	57.5	57.5	.....	45.0	.....	49.2	49.8	45.0	60.5	56.7	57.5	50.0	57.0	48 7	52.5
August	57.5	.....	73.8	.....	.....	45.6	52.4	43.8	53.7	52.0	.....	50.0	46.3	52.5	52.6
September ..	45.0	47.2	62 5	42.0	42.5	43 8	42.6	38.8	49.8	56.5	41.3	51.6	41.3	49.4	48.7
October	47.5	45.0	62.5	34.8	44.4	45.3	45.1	40.7	41 9	56.7	43.8	.....	40.0	46.7	45.5
November ..	.....	46.0	60.0	39.8	46.2	47.9	43.1	44 0	43.2	48.3	47.8	.....	41.3	50.6	47.7
December	44.5	47.5	60.0	40.5	48.0	47.8	42.4	43.4	44.4	52.5	48.3	58.2	42.5	50.7	48.4
Average....	49.3	47.5	63.6	39.8	45.1	46.7	46.1	42.6	49.0	54.6	47.2	51.7	44.9	49.5	49.1
OATS: per bush.															
July	51.5	47.5	52.5	52 5	.....	47.0	48.6	46.0	49.7	52.9	46.7	50.0	45.6	53.2	50.9
August	51.5	37.0	40.0	38.8	.....	36.1	42.5	37.0	40.1	41.6	40.0	42.5	35.5	42.0	41.0
September ..	31.2	30.3	31.9	29.1	29.5	32.0	28.6	27.5	33.6	34.9	30 2	35.3	30.8	34.1	32.1
October	28.9	27.8	28.5	25.8	25.9	32.5	25.6	26.8	28.6	29.1	27.8	25.8	26.1	33 2	29.8
November	.....	32.5	30.5	29.5	29.0	33.3	30.1	30.5	32.6	32.3	32.0	29.2	30.8	35.2	33.0
December	32.4	32.2	33.0	29.0	30.0	31.0	29.5	28.4	31.0	31.7	31.6	30.2	31.1	35.0	32.5
Average....	36.8	33.5	36.6	30.5	28.1	35.6	34.3	32.8	35.3	38.2	33.6	37.3	33.4	38.9	36.5
RYE: per bush.															
July	.....	.....	50.0	.....	.....	57.0	71.2	55.0	70.6	55.0	.....	.....	.....	78.5	69.2
August	.....	.....	52.5	.....	.....	61.6	71.3	55.0	....	60.0	.....	.....	.....	78.5	65.5
September ..	70.8	77.0	52.5	.....	80.0	67.5	75.0	65.0	63.0	80.0	.....	.....	.....	75.0	67.3
October	82.5	76.0	52.5	.....	76.0	68.8	77.5	70.0	65.3	80.0	.....	.....	.....	78.8	72.4
November....	.....	.....	52.5	.....	82.7	72.5	82.9	79.0	68.6	82.0	.....	.....	.....	84 0	75.7
December	86.4	.....	52 5	.....	85.0	72 5	84.4	82.0	67.9	85.0	.....	.....	.....	91.4	78.5
Average....	80.8	76.5	52.1	.....	79.8	66.5	76.6	67.8	66 9	66.3	.....	.....	.....	82.4	72.3
PEAS: per bush.															
July	72.5	67.5	.....	55.0	.....	72.4	70.3	62.5	72.9	66.9	63.5	62.5	67.5	74.4	70.3
August	72.5	69.3	.....	.....	.....	69.1	70.0	62.5	71.6	64.4	62.5	60 8	62.5	74.0	68.1
September ..	57.5	62 1	61.7	52.5	63.3	61.9	64.3	60.0	62.6	63.9	61 5	58.1	61.8	68.6	64.0
October	65.0	59.2	60.0	55.0	58.7	57 0	60.6	56.4	55.8	63.7	59.0	57.5	56.4	61.8	59.7
November ..	.....	60.5	60.0	60.5	61 3	60.1	61.5	59.5	58.7	61.7	63.3	58.5	60.9	66.0	62.6
December	61.3	61.3	60.0	.....	62.0	61.5	61.0	58.0	59.6	61.3	62.8	60.0	61.2	63.2	61.6
Average....	64.5	62.6	60.3	55.8	60.7	63.9	65.0	59.7	63.5	64.4	61.7	59.8	61 7	66.1	63.8

TABLE IV. MARKET PRICES.--*Continued.*

Products.	Belleville.	Brantford.	Brockville.	Chatham.	Cobourg.	Guelph.	Kingston.	Lindsay.	London.	Ottawa.	Peterborough.	St. Thomas.	Stratford.	Toronto.	The Province.
CORN (in ear): per bush.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.	cts.
October	.....	30.1	.....	27.5	.....	.....	35.0	.....	35.7	35 3	.....	.....	.....	.....	35.0
November	.....	31.3	.....	23.1	.....	.....	.....	.....	30.1	36.7	.....	.....	.....	.....	30.3
December	.....	28.8	.....	21.7	.....	.....	35.0	.....	27.8	33.0	.....	.....	.....	.....	27.6
Average	.....	29.8	.....	23.1	.....	.....	35.0	.....	31 2	35.5	.....	.....	.....	.....	31.1
BUCKWHEAT: per bush.															
October	45.0	41.0	38.3	.....	42.7	.....	40.6	.....	43.1	43.2	.....	.....	.....	.....	42.4
November	.....	.....	41.9	.....	50.0	.....	45.3	45.0	42.7	50.0	.....	.....	.....	.....	44.0
December	52.3	49.0	47.5	.....	49.0	.....	46.0	45.0	44.4	45.0	.....	.....	.....	.....	45.6
Average	49.8	45.0	43.3	.....	47.0	.....	43.8	45.0	43.4	45.1	.....	.....	.....	.....	44.1
BEANS: per bush.															
October	.....	.....	.....	99.4	.....	.....	.....	.....	112.5	112.5	.....	.....	.....	.....	110.8
November	.....	.....	.....	95.0	.....	.....	.....	.....	107.5	92.5	.....	.....	.....	.....	102.9
December	.....	.....	.....	91.3	.....	.....	.....	.....	104.6	.....	.....	.....	.....	.....	102.7
Average	.....	.....	.....	95.2	.....	.....	.....	.....	108.4	105.8	.....	.....	.....	.....	106.1
POTATOES: per bush.															
October	29.7	31.0	28.3	39.0	28.0	28.3	26.1	23 0	28 5	26.1	.....	31.1	28.4	35 0	31.0
November	.....	30.0	30.0	.....	.....	30.8	30.0	28.1	30.6	30.0	41 5	32.7	28.8	37.9	34.1
December	30.0	31.8	30.0	.....	26.8	31.7	30.0	27.5	30.0	26.7	43.5	32.7	30.0	37.4	33.2
Average	29.8	31.1	29.6	39.0	27.2	30.3	28.3	26.1	29.6	26.9	42.5	32.1	29.1	36.7	32.6
CARROTS: per bush.															
October	.....	.....	38.3	.....	.....	.....	.....	.....	25.5	20.0	.....	.....	.....	25.0	26.2
November	.....	.....	35.0	.....	.....	.....	.....	.....	27.6	23.5	.....	.....	.....	31 6	30.0
December	.....	.....	.....	.....	.....	.....	.....	.....	30.0	22.1	.....	.....	.....	30.0	29.4
Average	.....	.....	36.4	.....	.....	.....	.....	.....	28.3	21.7	.....	.....	.....	29.4	28.9
TURNIPS: per bush.															
October	.....	.....	27.5	.....	.....	.....	.....	.....	21.9	26.5	.....	.....	.....	21.8	22.2
November	.....	.....	23.8	.....	.....	.....	.....	.....	20.0	26.5	.....	.....	.....	20.9	20.9
December	.....	.....	.....	.....	.....	.....	.....	.....	20.0	25.0	.....	.....	.....	20.8	20.8
Average	.....	.....	25.4	.....	.....	.....	.....	.....	20.3	25.5	.....	.....	.....	21.2	21.2
WOOL: per lb.															
July	23.5	19.0	.....	18.0	.....	19.9	17.0	19.0	19.0	19.8	.....	19.5	20.5	21 5	19.5
August	23.5	20.0	.....	23.0	.....	19.5	17.0	19.0	19.0	17.8	.....	19 5	20 5	21.7	19.7
September	.....	19.3	.....	22.0	.....	19.5	16.8	19.0	20.1	19.0	.....	19.5	20.1	21.5	19.7
October	.....	19.0	19.0	19.0	.....	19.5	17.4	19.0	20.7	18.3	.....	19.5	19.0	21.7	19.9
November	.....	.....	19 0	.....	.....	18 8	16.0	19.0	17.6	19.0	.....	19.1	.....	21.4	18.8
December	19.0	19.0	19.0	.....	.....	18.0	16.1	19 0	17.5	17.3	.....	19 0	.....	22.7	18.7
Average	22.8	19.2	19.0	21.0	.....	19.2	16.8	19.0	19.0	18.4	.....	19.4	20.1	21.7	19.4
HAY: per ton.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
July	7 67	10 50	12 50	8 50	.....	11 80	.....	.....	10 48	11 54	.....	9 00	10 70	13 85	12 03
August	7 75	8 50	11 50	9 00	.....	10 25	.....	.....	9 53	8 64	....	9 00	9 56	12 67	10 93
September	9 50	11 13	11 25	7 50	14 50	10 50	11 75	7 50	11 37	9 75	.....	9 50	10 75	14 35	12 16
October	10 70	10 75	10 83	10 00	.....	12 25	8 94	8 70	10 52	10 05	.....	11 00	11 00	13 90	11 90
November	.....	10 00	11 50	.....	.....	12 50	8 83	9 50	11 09	9 42	.....	11 00	11 50	14 07	12 42
December	12 00	11 25	11 50	12 00	.....	11 60	8 25	9 50	10 57	9 88	.....	11 00	11 50	13 70	12 05
Average	9 63	10 68	11 54	9 71	14 50	11 50	9 30	8 83	10 59	9 87	.....	9 80	10 86	13 76	11 91

VALUES—FALL AND SPRING WHEAT.

TABLE V. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Fall and Spring Wheat in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91.

Counties.	Fall wheat.			Spring wheat.		
	1891.	1890.	1882-91.	1891.	1890.	1882 91.
	$	$	$	$	$	$
Essex	905,393	403,403	580,070	32,218	35,299	22,774
Kent	1,558,755	909,200	1,079,761	70,861	133,731	49,565
Elgin	1,163,285	788,128	797,623	18,388	21,371	21,151
Norfolk	866,704	581,870	555,375	15,155	9,619	10,507
Haldimand	675,049	417,047	484,461	61,370	73,970	40,452
Welland	480,230	325,292	331,087	8,021	9,631	15,902
Totals	5,649,416	3,424,940	3,828,377	206,013	283,621	160,291
Lambton	1,028,104	514,298	625,860	110,718	97,855	81,443
Huron	1,445,319	932,124	1,164,880	241,184	139,578	198,260
Bruce	889,643	670,253	814,569	215,078	191,067	169,079
Totals	3,363,066	2,116,675	2,605,309	566,980	428,500	448,782
Grey	472,467	314,543	472,517	431,657	409,628	505,373
Simcoe	1,276,599	822,005	1,025,194	563,470	443,186	480,059
Totals	1,749,066	1,136,548	1,497,711	995,127	852,814	985,432
Middlesex	1,920,268	1,286,618	1,330,585	80,932	77,964	126,076
Oxford	1,050,607	754,238	721,092	117,288	107,328	125,000
Brant	708,934	441,436	497,393	16,204	24,117	14,831
Perth	1,020,001	660,339	787,078	226,391	157,273	164,001
Wellington	348,184	217,741	432,612	484,447	334,649	285,292
Waterloo	900,979	656,169	731,942	54,736	43,393	61,975
Dufferin	142,673	83,905	168,280	426,554	344,303	282,890
Totals	6,091,646	4,040,446	4,668,982	1,406,552	1,089,027	1,060,065
Lincoln	472,373	299,796	349,903	32,025	31,952	27,670
Wentworth	601,072	382,651	496,167	70,332	67,043	38,379
Halton	411,419	245,433	368,026	89,577	111,127	56,377
Peel	488,131	271,964	474,044	346,786	313,881	213,480
York	774,608	484,239	707,420	488,975	390,419	405,670
Ontario	135,890	82,937	177,071	1,034,150	491,682	738,468
Durham	105,044	87,512	71,717	611,057	346,262	541,031
Northumberland	242,281	247,378	210,432	380,925	288,022	345,807
Prince Edward	112,773	72,473	44,213	64,160	81,078	77,389
Totals	3,343,591	2,174,383	2,898,993	3,117,987	2,121,466	2,444,271
Lennox and Addington	79,153	47,447	38,841	48,562	61,219	73,709
Frontenac	21,413	10,256	27,476	164,513	90,094	119,183
Leeds and Grenville	17,946	38,258	78,615	191,464	116,733	181,744
Dundas	10,194	4,027	17,206	88,766	51,437	75,811
Stormont	2,330	1,436	9,538	74,909	51,317	70,720
Glengarry	3,246	766	7,915	152,618	83,650	115,709
Prescott	.....	509	753	165,724	111,669	118,333
Russell	1,071	558	3,279	85,417	44,191	61,960
Carleton	1,824	14,072	18,926	631,536	245,839	355,582
Renfrew	3,722	7,481	14,457	430,785	297,391	365,599
Lanark	32,719	25,839	51,940	282,736	131,711	196,713
Totals	203,618	150,649	268,946	2,317,030	1,285,251	1,735,063
Victoria	56,876	40,716	132,055	583,447	417,837	447,621
Peterborough	103,991	125,140	171,223	477,159	306,286	323,025
Haliburton	1,760	3,472	1,912	26,090	19,483	16,731
Hastings	224,441	211,644	167,150	128,252	111,778	193,865
Totals	387,068	380,972	472,340	1,214,948	855,384	981,242
Muskoka	411	452	952	14,615	15,110	17,980
Parry Sound	901	1,849	721	13,188	12,001	19,296
Nipissing	.....	260	26	4,783	3,395	818
Algoma	11,953	12,701	8,527	93,796	68,836	106,066
Totals	13,265	15,262	10,226	126,382	99,342	144,160
The Province	20,800,736	13,439,875	16,250,884	9,951,019	7,015,405	7,959,306

VALUES—BARLEY AND OATS.

TABLE VI. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Barley and Oats in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91.

Counties.	Barley.			Oats.		
	1891.	1890.	1882-91.	1891.	1890.	1882-91.
	$	$	$	$	$	$
Essex	60,598	89,163	47,730	472,277	431,053	419,406
Kent	112,126	105,287	100,855	583,503	413,251	477,239
Elgin	82,336	95,834	71,903	498,890	364,447	444,556
Norfolk	61,701	65,402	84,625	354,476	247,459	310,542
Haldimand	64,147	99,873	164,422	228,884	207,904	264,705
Welland	39,830	29,614	47,575	260,046	156,549	222,214
Totals	420,738	485,173	517,110	2,398,076	1,820,663	2,138,662
Lambton	164,805	181,047	206,965	780,581	552,445	547,660
Huron	303,084	411,322	408,266	1,316,589	1,213,459	1,059,070
Bruce	182,756	217,784	263,904	991,484	908,722	740,040
Totals	650,645	810,153	879,135	3,088,654	2,674,626	2,346,770
Grey	177,689	198,940	293,738	1,396,385	1,244,559	1,050,224
Simcoe	403,336	362,904	435,379	1,077,438	942,316	811,481
Totals	581,025	561,844	729,117	2,473,823	2,186,875	1,861,705
Middlesex	205,584	218,332	223,203	1,195,830	1,036,743	1,017,449
Oxford	235,691	227,532	276,783	955,418	711,492	750,114
Brant	185,832	271,144	272,125	293,841	241,502	243,109
Perth	231,970	258,164	282,941	1,171,115	1,001,314	867,866
Wellington	449,580	467,966	542,149	1,379,873	1,219,876	993,191
Waterloo	276,216	310,757	284,638	676,524	540,964	501,863
Dufferin	154,992	156,900	165,474	560,071	434,450	382,542
Totals	1,739,865	1,910,795	2,047,313	6,232,672	5,186,341	4,756,134
Lincoln	32,704	50,961	57,792	214,532	172,128	211,204
Wentworth	130,886	168,477	194,012	382,360	322,939	375,466
Halton	110,487	144,793	193,795	308,803	257,352	252,220
Peel	371,734	434,507	521,392	591,536	454,503	416,638
York	699,130	561,135	883,625	1,319,353	999,997	952,147
Ontario	448,899	360,136	587,615	948,330	681,864	699,280
Durham	514,500	326,354	660,958	603,204	385,655	444,499
Northumberland	303,088	288,091	527,882	440,932	357,541	332,138
Prince Edward	265,435	310,302	435,393	191,461	155,414	140,126
Totals	2,876,863	2,644,756	4,062,464	5,000,511	3,787,393	3,823,718
Lennox and Addington	227,488	224,532	447,799	299,465	231,076	232,327
Frontenac	105,992	118,873	215,873	404,484	288,808	292,943
Leeds and Grenville	128,446	76,079	145,340	1,015,988	682,705	764,550
Dundas	76,455	54,377	105,489	487,943	310,109	382,864
Stormont	39,419	37,149	36,670	348,161	257,112	303,018
Glengarry	30,231	25,254	28,244	449,190	286,875	351,955
Prescott	57,254	55,275	44,164	379,528	325,032	298,877
Russell	35,551	26,324	21,794	313,461	269,952	221,088
Carleton	205,489	116,441	133,926	1,139,118	746,431	787,101
Renfrew	18,037	15,949	18,958	641,736	478,300	477,347
Lanark	43,136	37,823	41,209	654,627	451,739	432,501
Totals	967,498	788,076	1,239,466	6,133,701	4,328,139	4,544,571
Victoria	355,389	283,742	414,980	635,537	521,710	478,949
Peterborough	70,459	79,954	165,809	470,982	361,999	347,275
Haliburton	3,044	3,139	3,585	60,692	64,107	51,078
Hastings	229,832	239,903	464,457	561,348	461,244	450,667
Totals	658,724	606,738	1,048,831	1,728,559	1,409,060	1,327,969
Muskoka	7,670	5,703	6,432	122,381	115,426	95,297
Parry Sound	10,344	8,262	8,364	101,075	80,571	58,122
Nipissing	1,624	2,172	380	25,030	20,155	4,518
Algoma	10,679	7,613	8,479	74,001	78,485	60,026
Totals	30,317	23,750	23,655	322,487	294,637	217,963
The Province	7,925,675	7,831,285	10,547,091	27,378,483	21,687,734	21,017,492

VALUES—RYE AND PEAS.

TABLE VII. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Rye and Peas in Ontario in the years 1890 and 1891, with the yearly average for the ten years 1882-91.

Counties.	Rye.			Peas.		
	1891.	1890.	1882-91.	1891.	1890.	1882-91.
	$	$	$	$	$	$
Essex	7,601	7,821	9,049	23,063	44,603	42,024
Kent	12,144	16,971	9,120	75,223	116,284	117,695
Elgin	8,512	9,998	13,071	233,574	150,324	149,810
Norfolk	58,913	65,527	60,996	287,527	230,027	193,809
Haldimand	3,394	4,161	7,562	160,326	174,504	154,593
Welland	5,246	1,921	5,987	56,050	45,662	44,807
Totals	95,810	106,399	105,785	835,763	761,404	702,738
Lambton	1,434	4,626	2,335	136,676	145,220	114,279
Huron	5,032	2,419	2,934	718,856	554,924	471,453
Bruce	7,950	10,161	5,141	802,701	640,730	550,180
Totals	14,416	17,206	10,410	1,658,233	1,340,874	1,135,912
Grey	6,702	7,444	5,924	831,214	638,380	627,931
Simcoe	24,756	25,136	25,118	634,366	488,573	441,311
Totals	31,458	32,580	31,042	1,465,580	1,126,953	1,069,242
Middlesex	5,898	8,085	5,208	403,240	293,187	275,791
Oxford	7,403	12,665	10,743	325,626	195,552	212,808
Brant	5,695	14,437	9,019	191,488	147,944	120,566
Perth	85	625	1,494	471,899	346,964	334,872
Wellington	8,177	5,573	8,577	598,036	551,899	527,707
Waterloo	4,935	5,312	5,367	319,689	250,835	212,771
Dufferin	4,555	2,728	7,234	227,141	194,428	160,656
Totals	36,748	49,425	47,642	2,537,119	1,980,809	1,845,171
Lincoln	1,049	4,088	3,687	60,488	72,442	54,991
Wentworth	9,206	7,628	9,798	170,184	166,854	138,675
Halton	8,359	6,147	5,498	162,048	163,088	141,546
Peel	5,290	5,157	14,488	236,109	256,680	185,378
York	10,742	10,904	16,155	508,930	465,507	401,055
Ontario	13,458	11,748	26,554	514,990	286,751	351,182
Durham	31,955	29,039	42,680	392,274	224,186	268,222
Northumberland	86,406	82,106	89,525	320,362	248,373	222,351
Prince Edward	61,824	46,696	71,091	302,678	249,680	157,122
Totals	228,289	203,513	279,476	2,668,063	2,133,561	1,920,522
Lennox and Addington	29,438	26,181	41,903	154,709	110,005	104,442
Frontenac	39,667	25,555	36,763	159,301	109,248	123,199
Leeds and Grenville	30,837	30,422	60,919	100,715	57,303	75,791
Dundas	10,007	5,481	17,202	26,787	18,873	22,908
Stormont	4,136	3,062	5,520	38,489	21,322	32,430
Glengarry		1,589	614	62,546	43,689	63,362
Prescott		413	2,470	105,988	67,494	88,262
Russell	8,188	5,212	3,393	42,263	46,275	45,064
Carleton	23,266	43,477	59,996	225,658	137,635	173,938
Renfrew	96,913	82,241	78,746	317,056	284,813	266,825
Lanark	37,227	26,867	50,130	204,512	138,885	154,072
Totals	279,679	250,500	357,656	1,438,024	1,035,542	1,150,293
Victoria	11,417	16,680	12,312	278,328	229,138	208,710
Peterborough	35,083	45,446	31,495	240,614	215,126	183,107
Haliburton	2,679	3,522	2,633	28,577	24,025	19,566
Hastings	73,403	89,754	120,877	303,717	269,705	210,816
Totals	122,582	155,402	167,317	851,236	737,994	622,199
Muskoka	1,711	3,249	4,061	66,783	50,054	38,659
Parry Sound	4,237	1,956	4,116	47,875	30,143	21,719
Nipissing	2,446	821	327	10,361	8,730	1,909
Algoma	2,961	2,832	2,225	111,330	73,692	65,137
Totals	11,355	8,858	10,729	236,349	162,619	127,424
The Province	820,337	823,883	1,010,057	11,690,367	9,279,756	8,573,501

VALUES—CORN, BUCKWHEAT AND BEANS.

TABLE VIII. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Corn, Buckwheat and Beans in Ontario in the years 1890 and 1891, with the yearly average for the seven years 1885-91.

Counties.	Corn.			Buckwheat.			Beans.		
	1891.	1890.	1885-91.	1891.	1890.	1885-91.	1891.	1890.	1885-91.
	$	$	$	$	$	$	$	$	$
Essex	830,810	873,362	681,916	24,105	7,350	9,405	29,938	24,278	15,352
Kent	728,421	613,583	523,543	15,663	12,700	8,872	483,688	632,382	330,046
Elgin	378,425	247,688	290,084	22,625	18,873	13,274	72,088	64,123	34,262
Norfolk	278,611	197,867	238,317	48,223	48,780	39,107	2,955	7,869	6,073
Haldimand	27,443	27,934	33,057	5,736	4,186	5,661	3,236	6,350	2,955
Welland	148,420	81,850	109,217	39,589	17,061	17,843	25,776	17,810	11,461
Totals	2,392,130	2,042,284	1,876,134	155,941	108,950	94,162	617,681	752,812	400,149
Lambton	276,601	172,663	147,575	9,185	7,352	4,579	14,939	7,457	7,684
Huron	56,054	45,362	35,498	4,668	3,922	2,588	3,528	3,566	3,298
Bruce	32,278	24,026	15,940	6,848	5,177	3,612	3,909	3,469	2,659
Totals	364,933	242,051	199,013	20,701	16,451	10,779	22,376	14,492	13,641
Grey	19,493	30,561	12,431	5,847	4,848	3,189	3,987	9,021	3,067
Simcoe	33,918	24,968	17,726	7,092	7,232	3,633	3,209	1,804	2,353
Totals	53,411	55,529	30,157	12,939	12,080	6,822	7,196	10,825	5,420
Middlesex	346,866	247,363	219,816	4,530	3,266	4,059	7,497	7,862	5,640
Oxford	256,096	193,239	162,984	8,705	6,820	5,064	2,748	3,986	4,230
Brant	121,225	108,890	93,835	5,202	6,590	5,082	1,566	6,429	2,701
Perth	49,912	28,031	20,099	1,290	925	923	477	321	1,011
Wellington	25,992	28,383	14,141	3,490	6,257	2,061	361	1,002	829
Waterloo	41,589	28,844	21,359	1,681	1,238	897	170	1,568	758
Dufferin	3,981	3,446	1,955	3,076	679	1,249	2,206	719	757
Totals	845,661	638,196	534,189	27,974	25,775	19,335	15,025	21,887	15,926
Lincoln	159,304	78,479	116,420	10,497	8,367	6,089	3,992	6,733	3,720
Wentworth	136,436	101,775	89,962	7,690	11,389	6,894	4,348	11,471	3,876
Halton	53,893	39,429	26,628	1,087	559	983	186	383	743
Peel	27,617	20,514	14,118	3,826	1,591	2,133	509	540	854
York	64,374	49,904	34,185	5,961	1,096	2,174	3,384	2,538	2,885
Ontario	57,148	51,988	45,005	32,025	11,339	9,277	4,354	5,424	3,197
Durham	56,700	34,549	29,810	74,661	37,278	25,374	9,344	9,219	6,229
Northumberland	125,382	80,861	68,653	125,278	99,673	70,099	9,595	12,366	9,701
Prince Edward	136,708	136,785	89,718	101,138	89,246	77,096	4,272	8,816	8,255
Totals	817,562	594,286	514,499	362,163	260,538	200,119	39,984	57,490	39,460
Lennox and Add	86,460	45,806	42,598	66,655	62,681	36,531	8,207	6,542	3,914
Frontenac	67,660	41,249	32,926	31,484	23,828	18,200	5,967	3,251	6,416
Leeds & Grenville	325,593	191,219	144,077	69,656	75,176	52,906	12,561	14,884	9,205
Dundas	117,958	40,115	44,273	32,919	31,946	21,513	7,631	7,324	7,288
Stormont	67,413	38,636	28,216	34,131	28,549	23,745	7,703	5,360	4,756
Glengarry	54,159	46,076	20,733	15,951	15,219	10,082	3,695	5,962	2,626
Prescott	69,119	29,083	28,476	18,943	14,547	13,557	19,514	8,209	10,969
Russell	33,695	13,372	9,858	19,117	15,114	10,366	4,346	4,557	3,443
Carleton	90,377	51,598	34,031	48,199	27,451	34,622	9,459	17,733	9,944
Renfrew	23,777	10,843	8,885	20,714	13,817	12,254	14,448	15,928	11,938
Lanark	44,490	38,659	23,279	55,356	46,726	43,256	6,455	6,894	5,305
Totals	980,701	546,656	417,352	413,125	355,054	277,032	99,986	96,644	75,804
Victoria	16,421	13,286	12,315	34,751	18,517	9,512	2,831	3,653	1,839
Peterborough	12,543	12,138	6,835	26,313	21,851	10,966	2,491	7,248	2,332
Haliburton	1,894	1,793	1,421	7,077	3,772	2,433	993	668	606
Hastings	194,689	122,681	97,636	74,889	50,035	43,376	4,631	9,622	6,383
Totals	225,547	149,898	118,207	143,030	94,175	66,287	10,946	21,191	11,160
Muskoka	3,309	2,612	2,373	7,362	5,396	3,771	870	1,070	941
Parry Sound	1,400	683	592	1,808	2,452	1,050	721	1,054	378
Nipissing	1,110	409	217	1,743	939	383	1,665	293	280
Algoma	2,009	806	1,084	3,405	1,290	1,075	96	565	375
Totals	7,828	4,510	4,266	14,318	10,077	6,279	3,352	2,982	1,974
The Province	5,687,773	4,273,410	3,693,817	1,150,191	883,100	680,815	816,546	978,323	563,534

VALUES—HAY AND CLOVER AND POTATOES.

TABLE IX. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Hay and Clover and Potatoes in Ontario in the years 1890 and 1891, with the yearly average for the seven years 1885-91.

Counties.	Hay and Clover.			Potatoes.		
	1891.	1890.	1885-91.	1891.	1890.	1885-91.
	$	$	$	$	$	$
Essex	639,186	553,042	667,399	83,943	91,453	97,480
Kent	741,433	840,919	872,235	145,743	128,804	132,862
Elgin	688,124	827,969	820,839	121,031	98,697	105,324
Norfolk	562,283	578,203	545,923	109,944	88,911	95,667
Haldimand	380,287	649,269	622,152	34,167	41,167	54,963
Welland	541,786	729,468	652,057	68,021	63,406	73,796
Totals	3,553,099	4,178,870	4,180,605	562,849	512,438	559,492
Lambton	930,052	838,844	883,059	136,264	112,591	112,760
Huron	1,196,800	1,664,889	1,489,309	272,786	238,455	252,017
Bruce	800,745	1,350,944	1,202,582	279,459	234,387	240,902
Totals	2,927,597	3,854,677	3,574,950	688,509	585,433	605,679
Grey	1,403,951	1,905,178	1,581,136	354,548	482,444	385,730
Simcoe	1,082,964	1,080,858	1,073,688	399,088	435,437	375,855
Totals	2,486,915	2,986,036	2,654,824	753,636	917,881	761,585
Middlesex	1,401,878	1,507,590	1,464,041	282,177	255,793	221,645
Oxford	1,057,918	1,146,962	1,033,877	176,486	125,969	129,952
Brant	441,123	596,815	447,896	115,169	104,928	96,768
Perth	892,762	1,266,332	1,104,080	187,503	194,773	166,814
Wellington	1,186,188	1,438,950	1,328,950	296,129	365,749	297,613
Waterloo	430,653	680,774	646,866	134,181	155,619	137,977
Dufferin	523,528	497,630	471,217	194,278	239,237	185,118
Totals	5,934,050	7,135,053	6,496,927	1,385,923	1,442,068	1,235,887
Lincoln	439,681	616,872	584,869	72,386	62,068	71,223
Wentworth	511,332	754,884	632,792	200,678	173,632	161,493
Halton	317,914	424,681	418,142	62,438	65,017	67,030
Peel	514,941	527,761	528,856	138,632	122,314	120,353
York	1,118,027	1,068,338	1,025,999	341,987	384,200	333,610
Ontario	723,818	847,605	773,968	250,010	202,578	223,618
Durham	551,099	711,883	615,997	159,589	138,850	155,579
Northumberland	518,669	735,645	697,387	191,646	211,288	184,508
Prince Edward	421,412	422,074	426,925	87,628	80,510	91,474
Totals	5,116,893	6,049,743	5,704,935	1,504,994	1,440,457	1,408,888
Lennox and Addington	741,517	760,449	658,503	148,946	117,789	149,779
Frontenac	809,201	874,524	759,249	206,160	159,974	158,981
Leeds and Grenville	972,416	1,431,127	1,492,828	379,707	333,643	354,656
Dundas	440,062	477,851	595,931	142,178	161,979	137,593
Stormont	405,440	409,568	549,[illegible]	86,165	96,729	94,262
Glengarry	306,147	432,027	630,261	112,053	111,567	111,787
Prescott	612,603	508,657	550,915	150,779	158,596	141,513
Russell	260,424	223,610	254,763	80,372	78,137	67,010
Carleton	805,902	667,076	877,031	340,557	358,305	330,326
Renfrew	572,311	672,498	680,058	255,818	220,324	246,867
Lanark	586,901	665,622	840,469	199,814	186,652	197,151
Totals	6,512,924	7,123,009	7,889,797	2,102,549	1,983,695	1,989,925
Victoria	431,321	485,284	460,848	156,610	214,749	178,189
Peterborough	360,087	520,296	431,605	139,006	155,873	138,392
Haliburton	73,520	94,565	109,906	36,460	38,913	34,764
Hastings	618,963	1,027,021	860,320	251,643	229,395	274,023
Totals	1,483,891	2,127,166	1,862,679	583,719	638,930	625,368
Muskoka	140,276	329,694	275,451	79,018	78,360	83,462
Parry Sound	187,582	173,867	127,554	75,448	70,863	55,987
Nipissing	36,004	65,373	14,483	32,615	26,731	8,478
Algoma	118,993	208,536	147,387	72,959	82,719	62,118
Totals	482,855	777,470	564,875	260,040	258,673	210,045
The Province	28,498,224	34,232,024	32,929,592	7,842,219	7,779,575	7,396,869

VALUES—CARROTS AND TURNIPS.

TABLE X. Showing by County Municipalities and groups of Counties the value at market prices of the total crop of Carrots and Turnips in Ontario in the years 1890 and 1891, with the yearly average for the seven years, 1885-91.

Counties.	Carrots.			Turnips.		
	1891.	1890.	1885-91.	1891.	1890.	1885-91.
	$	$	$	$	$	$
Essex	3,557	11,073	6,832	5,290	16,704	11,632
Kent	8,659	23,605	14,282	17,604	37,026	25,167
Elgin	13,126	24,965	15,617	22,523	36,019	26,866
Norfolk	7,084	21,648	12,133	64,423	109,662	95,865
Haldimand	2,537	8,742	7,248	5,215	7,526	8,631
Welland	3,251	4,170	6,582	5,448	13,002	12,532
Totals	38,214	94,203	62,694	120,503	219,939	180,693
Lambton	10,310	27,714	17,518	22,972	23,967	20,534
Huron	25,260	50,646	45,349	430,466	766,013	605,693
Bruce	12,206	38,549	23,824	375,522	626,072	533,161
Totals	47,776	116,909	86,691	828,960	1,416,052	1,159,388
Grey	18,974	66,480	46,506	590,576	1,035,500	830,759
Simcoe	24,064	64,970	51,469	267,961	418,166	334,364
Totals	43,038	131,450	97,975	858,537	1,453,666	1,165,123
Middlesex	34,341	72,626	43,414	90,429	159,986	138,246
Oxford	18,937	39,921	33,818	412,608	636,417	534,538
Brant	8,330	27,906	20,917	227,505	384,525	298,967
Perth	15,323	61,310	40,905	320,153	512,346	398,639
Wellington	14,024	43,810	24,636	814,814	1,363,850	1,219,923
Waterloo	17,040	45,951	33,318	282,515	496,814	437,602
Dufferin	1,408	10,747	10,767	171,837	279,683	208,423
Totals	109,403	302,271	207,775	2,319,861	3,833,621	3,236,338
Lincoln	3,460	11,056	9,886	11,238	24,146	19,209
Wentworth	16,480	29,512	21,873	170,056	395,704	290,357
Halton	3,142	12,172	12,665	116,804	226 935	177,910
Peel	7,007	25,715	22,331	100,333	157,677	115,859
York	20,345	104,099	68,011	258,714	478,679	332,976
Ontario	13,584	66,046	49,459	791,248	1,606,761	1,177,716
Durham	13,115	58,684	47,103	344,472	556,335	505,698
Northumberland	9,996	32,568	24,803	199 230	405,965	316,864
Prince Edward	2,700	5,856	4,187	4,826	9,558	6,904
Totals	89,829	345,708	260,318	1,996,921	3,861,760	2,943,493
Lennox and Addington	2,579	6,746	4,852	5,861	6,562	7,258
Frontenac	12,341	7,581	13,242	23,075	17,234	29,331
Leeds and Grenville	13,201	28,611	15,747	21,468	36,118	22,702
Dundas	14,034	10,836	6,506	2,952	5,144	3,815
Stormont	2,386	2,835	2,681	2,590	13,716	5,647
Glengarry	4,744	2,835	3,300	3,520	5,914	4,348
Prescott	1,901	3,698	3,798	9,072	5,206	10,506
Russell	10,850	23,134	13,802	25,792	60,582	33,476
Carleton	24,661	95,502	46,875	94,663	245,146	132,206
Renfrew	5,999	10,144	7,180	40,079	61,890	45,973
Lanark	8,505	21,674	11,465	32,834	46,229	40,815
Totals	101,201	213,596	129,448	261,906	503,741	336,077
Victoria	11,250	28,856	31.116	193,447	303,385	305,525
Peterborough	15,397	56,065	28,600	112,811	168,857	113,551
Haliburton	1,602	2,677	1,963	12,140	21,613	20,907
Hastings	7,993	21,427	15,404	49,462	67,976	66,116
Totals	36,242	109,025	77,083	367,860	561,831	506,099
Muskoka	5,074	7,875	6,039	41,850	76,620	75,849
Parry Sound	3,713	3,142	2,395	50,793	53,611	46,795
Nipissing	120	630	107	9,180	8,602	2,540
Algoma	2,142	1,512	2,243	28,974	52,941	37,639
Totals	11,049	13,159	10,784	130,797	191,774	162,823
The Province	476,752	1,326,321	932,768	6,885,345	12,042,384	9,690,034

VALUES—WHEAT TO PEAS AND CORN TO TURNIPS.

TABLE XI. Showing by County Municipalities and groups of Counties the aggregate value of Wheat, Barley, Oats, Rye and Peas, and of Corn, Buckwheat, Beans, Hay, Potatoes, Carrots and Turnips in Ontario in 1890 and 1891, with the yearly average of the first group for ten years 1882-91, and of the second group for seven years 1885-91.

Counties.	Wheat, Barley, Oats, Rye and Peas.			Corn, Buckwheat, Beans, Hay, Potatoes, Carrots and Turnips.		
	1891.	1890.	1882-91.	1891.	1890.	1885-91.
	$	$	$	$	$	$
Essex	1,501,150	1,011,342	1,121,053	1,616,829	1,577,262	1,490,016
Kent	2,412,612	1,694,724	1,834,175	2,141,211	2,289,019	1,907,007
Elgin	2,004,985	1,430,102	1,498,114	1,317,942	1,318,334	1,306,266
Norfolk	1,644,476	1,199,904	1,215,854	1,073,523	1,052,940	1,032,485
Haldimand	1,193,170	977,459	1,116,195	458,621	745,174	734,667
Welland	849,423	568,569	667,572	832,291	926,767	883,488
Totals	9,605,816	6,882,200	7,452,963	7,440,417	7,909,496	7,353,929
Lambton	2,222,318	1,495,491	1,578,542	1,400,323	1,190,588	1,193,709
Huron	4,030,064	3,253,826	3,304,863	1,989,562	2,772,853	2,433,752
Bruce	3,089,612	2,638,717	2,542,913	1,510,967	2,282,624	2,022,680
Totals	9,341,994	7,388,034	7,426,318	4,900,852	6,246,065	5,650,141
Grey	3,316,114	2,813,494	2,955,707	2,397,376	3,534 032	2,862,818
Simcoe	3,979,965	3,084,120	3,218,542	1,818,296	2,033,435	1,859,088
Totals	7,296,079	5,897,614	6,174,249	4,215,672	5,567,467	4,721,906
Middlesex	3,811,752	2,920,929	2,978,312	2,167,718	2,254,486	2,096,861
Oxford	2,692,033	2,008,807	2,096,540	1,933,498	2,153,314	1,904,463
Brant	1,401,994	1,140,580	1,157,043	920,120	1,236,083	966,166
Perth	3,121,461	2,364,679	2,438,252	1,467,420	2,064,038	1,732,471
Wellington	3,268,297	2,797,704	2,789,528	2,340,998	3,248,001	2,888,153
Waterloo	2,233,079	1,807,430	1,798,556	907,829	1,410,808	1,278,777
Dufferin	1,545,986	1,216,714	1,167,076	900,314	1,032,141	879,486
Totals	18,044,602	14,256,843	14,425,307	10,637,897	13,398,871	11,746,377
Lincoln	813,171	631,367	705,247	709,558	807,721	811,416
Wentworth	1,364,040	1,115,592	1,252,497	1,047,020	1,478,369	1,207,247
Halton	1,090,693	927,940	1,017,462	555,464	769,176	704,101
Peel	2,039,586	1,736,692	1,825,420	792,865	856,112	804,504
York	3,801,738	2,912,201	3,366,072	1,812,792	2,028,854	1,799,840
Ontario	3,095,717	1,915,118	2,580,170	1,872,187	2,791,741	2,282,240
Durham	2,258,034	1,399,008	2,029,107	1,208,940	1,546,798	1,385,790
Northumberland	1,773,994	1,511,511	1,728,135	1,179,796	1,578,366	1,372,015
Prince Edward	998,331	915,643	925,334	758,684	752,845	704,559
Totals	17,235,304	13,065,072	15,429,444	9,928,346	12,609,982	11,071,712
Lennox and Addington	838,815	700,460	939,021	1,060,225	1,006,575	903,435
Frontenac	895,370	642,834	815,437	1,155,888	1,127,641	1,018,345
Leeds and Grenville	1,515,396	1,001,500	1,306,959	1,794,602	2,110,778	2,092,121
Dundas	700,152	444,304	621,480	757,734	735,195	816,919
Stormont	507,444	371,398	457,896	608,828	595,393	709,096
Glengarry	697,831	441,823	567,799	500,269	619,600	783,137
Prescott	708,494	560,392	552,859	881,931	727,996	759,734
Russell	485,951	392,512	356,578	434,596	418,506	392,718
Carleton	2,226,891	1,303,895	1,529,469	1,413,818	1,462,811	1,465,035
Renfrew	1,508,249	1,166,175	1,221,932	933,146	1,005,444	1,013,155
Lanark	1,254,957	812,864	926,565	934,355	1,012,456	1,161,740
Totals	11,339,550	7,838,157	9,295,995	10,472,392	10,822,395	11,115,435
Victoria	1,920,994	1,509,823	1,694,627	846,631	1,067,730	999,344
Peterborough	1,398,288	1,133,951	1,221,934	668,648	942,328	732,281
Haliburton	122,842	117,748	95,505	133,686	164,001	172,000
Hastings	1,520,993	1,384,028	1,607,832	1,202,270	1,528,157	1,363,258
Totals	4,963,117	4,145,550	4,619,898	2,851,235	3,702,216	3,266,883
Muskoka	213,571	189,994	163,381	277,759	501,627	447,886
Parry Sound	177,620	134,782	112,338	321,465	305,672	234,751
Nipissing	44,244	35,533	7,978	82,437	102,977	26,488
Algoma	304,720	244,159	250,460	228,578	348,369	251,921
Totals	740,155	604,468	534,157	910,239	1,258,645	961,046
The Province	78,566,617	60,077,938	65,358,331	51,357,050	61,515,137	55,887,429

VALUES--ALL FIELD CROPS AND WOOL.

TABLE XII. Showing by County Municipalities and groups of Counties the aggregate value of all Field Crops in Ontario in the years 1890 and 1891, with the yearly average (determined by combining averages in preceding table); also the value, at market price, of the total clip of Wool in 1890 and 1891, with the yearly average for the seven years 1885-91.

Counties.	All field crops.			Wool.		
	1891.	1890.	Yearly Average.	1891.	1890.	1885-91.
	$	$	$	$	$	$
Essex	3,117,979	2,588,604	2,611,069	17,223	17,199	16,668
Kent	4,553,823	3,983,743	3,741,182	24,661	23,271	21,821
Elgin	3,322,927	2,748,436	2,804,380	29,851	27,359	23,569
Norfolk	2,717,999	2,252,844	2,248,339	17,656	14,914	15,615
Haldimand	1,651,791	1,722,633	1,850,862	18,498	18,295	18,750
Welland	1,681,714	1,495,436	1,551,060	11,974	12,403	13,546
Totals	17,046,233	14,791,696	14,806,892	119,863	113,441	109,969
Lambton	3,622,641	2,686,079	2,772,251	31,720	29,805	26,258
Huron	6,019,626	6,026,679	5,738,615	57,448	47,785	50,391
Bruce	4,600,579	4,921,341	4,565,593	60,435	55,733	54,201
Totals	14,242,846	13,634,099	13,076,459	149,603	133,323	130,850
Grey	5,713,490	6,347,526	5,818,525	82,917	73,263	75,237
Simcoe	5,798,261	5,117,555	5,077,630	49,628	43,012	48,953
Totals	11,511,751	11,465,081	10,896,155	132,545	116,275	124,190
Middlesex	5,979,470	5,175,415	5,075,173	49,970	41,048	39,104
Oxford	4,625,531	4,162,121	4,001,003	17,033	13,244	17,621
Brant	2,322,114	2,376,663	2,123,209	13,142	11,911	13,319
Perth	4,588,881	4,428,717	4,170,723	35,438	32,223	32,925
Wellington	5,609,295	6,045,705	5,577,681	53,165	46,319	50,270
Waterloo	3,140,908	3,218,238	3,077,333	23,798	20,969	22,090
Dufferin	2,416,300	2,248,855	2,046,562	19,995	17,419	19,201
Totals	28,682,499	27,655,714	26,171,684	212,541	183,133	194,530
Lincoln	1,513,729	1,439,088	1,516,663	11,100	8,231	9,754
Wentworth	2,411,060	2,593,961	2,459,744	17,570	14,185	15,506
Halton	1,646,157	1,697,116	1,721,563	13,015	11,441	12,927
Peel	2,832,451	2,592,804	2,629,924	18,693	12,174	18,214
York	5,614,530	4,941,055	5,165,912	27,634	24,582	29,449
Ontario	4,967,904	4,706,859	4,862,410	34,639	25,958	30,584
Durham	3,467,014	2,945,806	3,414,897	30,612	18,670	23,242
Northumberland	2,953,790	3,089,877	3,100,150	21,383	17,672	21,936
Prince Edward	1,757,015	1,668,488	1,629,893	7,739	6,805	8,356
Totals	27,163,650	25,675,054	26,501,156	182,385	139,718	169,968
Lennox and Addington	1,899,040	1,707,035	1,842,456	10,741	11,322	13,687
Frontenac	2,051,258	1,770,475	1,833,782	16,568	16,137	16,739
Leeds and Grenville	3,309,998	3,112,278	3,399,080	24,745	26,228	30,271
Dundas	1,457,886	1,179,499	1,438,399	7,199	6,566	9,001
Stormont	1,113,272	966,791	1,166,992	6,637	7,451	9,095
Glengarry	1,198,100	1,061,423	1,350,936	13,610	10,678	12,975
Prescott	1,590,425	1,288,388	1,312,593	8,912	9,236	10,206
Russell	920,547	811,018	749,296	8,316	7,236	7,230
Carleton	3,640,709	2,766,706	2,994,504	20,084	21,472	25,617
Renfrew	2,441,395	2,171,619	2,235,087	36,727	33,870	33,904
Lanark	2,189,312	1,825,320	2,088,305	32,418	29,091	30,346
Totals	21,811,942	18,660,552	20,411,430	185,957	179,287	199,071
Victoria	2,767,625	2,577,553	2,693,971	24,197	20,551	22,900
Peterborough	2,066,936	2,076,279	1,954,215	16,076	13,323	16,040
Haliburton	256,528	281,749	267,505	4,014	3,124	3,277
Hastings	2,723,263	2,912,185	2,971,090	16,740	16,697	22,063
Totals	7,814,352	7,847,766	7,886,781	61,027	53,695	64,280
Muskoka	491,330	691,621	611,267	7,690	5,961	6,685
Parry Sound	499,085	440,454	347,089	5,749	4,612	3,330
Nipissing	126,681	138,510	34,466	623	446	153
Algoma	533,298	592,528	502,381	8,656	7,923	5,482
Totals	1,650,394	1,863,113	1,495,203	22,718	18,942	15,650
The Province	129,923,667	121,593,075	121,245,760	1,066,639	937,814	1,008,503

VALUE PER ACRE—FALL WHEAT, SPRING WHEAT AND BARLEY.

TABLE XIII. Showing by County Municipalities and groups of Counties the market value of crop per acre of Wheat and Barley in Ontario, in 1890 and 1891, with the yearly average for ten years 1882-91.

Counties.	Fall wheat.			Spring wheat.			Barley.		
	1891.	1890.	1882-91.	1891	1890.	1882-91.	1891.	1890.	'82-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	23 87	15 54	18 24	16 81	12 14	13 44	13 21	11 30	13 83
Kent	25 01	18 84	18 13	17 37	13 06	13 83	14 58	12 05	14 77
Elgin	27 29	20 16	18 40	18 12	14 88	13 01	15 27	11 90	14 79
Norfolk	25 49	19 03	16 90	15 61	12 51	12 54	12 42	10 74	13 99
Haldimand	20 92	14 13	14 82	12 73	10 13	11 79	8 00	7 38	12 10
Welland	21 68	16 01	14 89	13 19	10 77	11 79	12 77	8 23	12 75
Group	24 43	17 68	17 21	15 36	12 04	12 80	12 46	10 31	13 13
Lambton	25 30	17 14	17 85	18 58	13 79	12 98	14 48	10 44	14 21
Huron	26 15	20 72	18 18	20 72	14 88	12 38	14 09	12 70	14 98
Bruce	24 63	20 44	17 83	18 21	13 88	12 72	14 34	13 10	14 29
Group	25 47	19 64	17 99	19 28	14 17	12 61	14 26	12 21	14 59
Grey	23 30	16 77	18 20	17 28	12 14	12 99	13 85	12 65	13 64
Simcoe	23 78	17 14	19 11	19 04	12 05	13 94	14 78	11 85	14 08
Group	23 64	17 04	18 81	18 24	12 10	13 44	14 48	12 12	13 90
Middlesex	27 77	21 38	18 67	19 14	15 79	12 79	14 98	12 30	14 66
Oxford	27 39	22 23	18 78	20 07	14 97	14 11	16 45	13 75	16 52
Brant	26 34	20 63	17 39	17 65	15 43	12 53	12 82	12 30	14 65
Perth	28 24	20 25	18 31	21 55	15 89	13 69	16 40	13 96	16 29
Wellington	25 20	17 99	18 17	20 81	16 07	14 01	15 52	13 75	15 15
Waterloo	24 54	20 16	18 87	20 62	15 25	13 46	15 46	14 91	16 62
Dufferin	21 68	17 14	17 50	19 97	13 88	13 58	13 94	12 55	13 87
Group	26 76	20 75	18 42	20 45	15 11	13 65	15 18	13 44	15 50
Lincoln	22 25	16 49	16 46	13 66	10 59	12 57	10 56	9 59	13 38
Wentworth	25 11	16 11	16 86	16 16	13 06	13 30	11 98	10 89	14 85
Halton	21 97	15 07	17 40	16 54	12 60	13 76	12 57	12 35	15 19
Peel	20 92	16 86	18 83	19 69	13 97	15 58	13 55	11 80	14 94
York	23 87	20 06	20 02	20 35	11 87	15 51	15 96	10 99	15 81
Ontario	24 44	19 97	20 48	21 00	9 59	15 65	15 32	10 54	15 47
Durham	22 63	20 63	19 04	19 32	9 68	15 00	15 22	8 63	14 56
Northumberland	17 31	19 22	18 19	16 44	9 86	12 74	12 62	8 89	12 30
Prince Edward	17 12	21 67	16 58	17 00	11 78	12 35	11 78	9 79	11 32
Group	22 22	17 66	18 23	19 30	10 85	14 75	14 12	10 30	14 22
Lennox and Addington	16 36	17 90	16 10	17 09	9 40	13 03	12 67	8 68	12 17
Frontenac	17 21	14 51	17 01	19 42	9 59	13 71	12 91	9 49	12 71
Leeds and Grenville	15 98	14 32	16 77	20 72	8 86	14 23	14 44	9 14	13 77
Dundas	20 07	14 13	17 67	25 36	12 14	16 94	15 71	10 19	16 40
Stormont	23 78	11 30	17 03	22 11	12 60	16 19	15 76	11 30	15 22
Glengarry	16 65	11 78	15 58	19 97	10 50	14 70	13 94	10 24	12 64
Prescott		11 30	11 77	19 88	12 33	14 38	14 63	11 04	14 20
Russell	25 50	15 07	17 08	24 43	12 42	15 55	16 01	11 85	13 55
Carleton	26 43	18 09	14 71	28 06	9 77	16 26	19 59	12 45	16 17
Renfrew	15 97	17 90	17 42	19 42	11 23	15 09	12 57	9 49	12 93
Lanark	16 64	11 87	17 45	20 07	8 22	13 60	15 22	10 64	14 13
Group	16 70	15 14	16 70	21 92	10 23	14 88	14 77	9 90	13 36
Victoria	21 11	14 41	17 79	19 23	11 78	14 04	15 56	11 04	13 89
Peterborough	16 74	14 98	17 49	15 61	10 59	12 36	12 42	10 09	13 24
Haliburton	19 78	12 81	14 82	15 79	10 04	11 99	12 03	10 19	12 90
Hastings	17 59	17 90	17 66	16 35	10 68	13 70	12 37	8 94	12 58
Group	17 79	16 37	17 62	17 26	11 14	13 34	13 92	9 98	13 17
Muskoka	15 22	14 13	15 61	17 09	12 51	13 62	12 08	10 04	11 80
Parry Sound	15 02	11 78	14 71	14 49	10 50	14 44	11 34	10 94	12 19
Nipissing		13 00	13 00	16 72	13 06	14 87	12 03	11 19	11 52
Algoma	23 30	18 27	19 08	19 88	14 24	18 04	13 80	10 69	14 13
Group	22 11	16 88	18 29	18 67	13 35	16 78	12 34	10 66	12 69
The Province	24 47	18 66	18 00	19 49	11 66	14 12	14 33	11 17	14 19

VALUE PER ACRE—OATS, RYE AND PEAS.

TABLE XIV. Showing by County Municipalities and groups of Counties the market value of crop per acre of Oats, Rye and Peas in Ontario, in 1890 and 1891, with the yearly average for the ten years 1882-91.

Counties.	Oats.			Rye.			Peas.		
	1891.	1890.	1882-91.	1891.	1890.	1882-91.	1891.	1890.	'82-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	13 94	10 56	13 58	15 11	8 96	11 69	11 80	10 67	11 42
Kent	15 84	11 80	14 34	15 98	11 44	12 32	12 19	9 11	11 44
Elgin	15 55	10 52	13 64	13 95	8 96	10 52	15 76	7 90	11 35
Norfolk	13 87	8 80	11 61	11 78	6 75	8 18	14 04	9 65	11 91
Haldimand	9 53	8 14	11 44	9 61	7 38	9 91	9 19	9 53	10 94
Welland	13 07	7 23	11 23	13 52	7 91	10 08	11 10	7 54	10 33
Group	13 92	9 80	12 85	12 59	7 60	9 14	12 68	9 04	11 35
Lambton	15 84	10 15	13 10	11 56	10 01	9 85	13 72	9 17	11 35
Huron	15 18	12 82	13 33	14 46	7 91	10 55	17 35	12 18	13 91
Bruce	13 47	12 33	11 86	13 52	10 54	10 89	17 10	14 71	14 26
Group	14 74	11 95	12 78	13 60	9 93	10 55	16 86	12 78	13 76
Grey	13 29	12 21	11 60	13 01	7 22	10 43	15 89	13 15	13 47
Simcoe	14 78	12 45	12 40	13 52	8 27	10 83	16 33	13 02	13 49
Group	13 89	12 31	11 94	13 41	8 01	10 75	16 08	13 09	13 48
Middlesex	15 88	12 33	13 82	14 89	9 06	10 27	16 33	9 83	12 03
Oxford	17 12	12 21	14 03	14 46	8 43	9 22	16 65	9 47	13 12
Brant	14 67	11 67	13 19	12 80	8 91	8 75	15 12	12 00	12 65
Perth	17 48	14 63	14 95	12 14	7 91	8 69	18 25	11 82	14 09
Wellington	15 77	13 40	13 46	12 80	8 96	10 67	15 89	12 72	13 97
Waterloo	15 95	12 21	13 72	15 33	9 22	10 46	17 10	12 54	14 02
Dufferin	14 27	10 85	12 39	14 46	7 64	10 78	14 16	12 66	12 99
Group	16 09	12 75	13 79	13 94	8 75	9 80	16 53	11 59	13 39
Lincoln	11 35	8 51	11 78	13 45	6 75	9 26	9 44	9 41	10 76
Wentworth	13 69	10 60	13 06	13 30	7 91	10 30	13 46	11 88	12 49
Halton	14 09	11 47	13 05	14 82	7 01	10 33	14 29	11 88	13 22
Peel	16 50	12 25	13 71	11 28	8 80	12 10	13 91	12 54	12 76
York	17 81	13 07	14 71	14 17	10 01	10 22	15 89	12 90	13 81
Ontario	16 46	12 41	13 95	11 86	7 59	10 64	16 65	10 25	12 97
Durham	15 04	10 56	12 92	11 86	7 43	9 21	15 12	10 13	12 22
Northumberland	13 58	10 36	10 88	9 11	6 64	7 97	14 10	12 30	10 89
Prince Edward	12 85	10 73	10 23	11 50	7 38	8 31	14 80	13 21	11 08
Group	15 44	11 57	13 19	10 74	7 20	8 85	14 87	11 77	12 46
Lennox and Addington	13 61	9 17	10 39	10 48	7 59	8 86	14 16	11 16	11 56
Frontenac	13 36	9 66	10 49	11 28	7 54	10 01	14 99	10 61	11 35
Leeds and Grenville	14 27	9 45	11 53	14 53	7 33	10 86	16 21	10 43	12 09
Dundas	16 13	10 40	12 93	17 14	11 28	13 78	17 23	14 95	13 80
Stormont	15 07	11 51	12 61	14 46	9 22	12 60	17 10	13 02	13 03
Glengarry	14 16	9 41	11 61	.....	7 91	10 07	14 16	10 97	11 40
Prescott	13 76	10 48	11 25	.....	7 64	10 88	17 48	10 55	10 57
Russell	15 70	12 04	11 86	18 08	11 07	13 25	15 50	11 46	12 39
Carleton	17 56	11 71	12 97	16 12	9 54	10 90	18 25	13 75	13 68
Renfrew	13 83	11 06	11 54	13 16	9 01	11 52	14 61	13 39	12 87
Lanark	15 40	11 01	11 49	13 74	8 01	11 52	17 35	12 24	13 50
Group	14 97	10 52	11 79	13 14	8 47	10 86	15 87	12 10	12 41
Victoria	14 56	12 41	12 18	13 45	9 17	10 31	15 76	13 39	12 90
Peterborough	12 85	11 38	11 35	10 63	7 43	9 14	15 12	13 33	12 07
Haliburton	11 72	11 10	9 95	12 94	8 59	10 13	12 44	11 46	11 15
Hastings	12 37	10 64	10 66	11 28	8 54	9 30	14 61	13 02	11 25
Group	13 21	11 46	11 31	11 28	8 24	9 35	15 02	13 16	12 02
Muskoka	11 90	10 93	10 54	14 03	8 85	11 28	15 95	13 33	13 14
Parry Sound	10 73	11 64	10 81	14 46	12 70	12 90	14 23	12 00	13 21
Nipissing	12 05	12 08	12 05	13 66	10 01	12 58	14 29	12 54	13 44
Algoma	10 26	11 30	12 47	14 17	9 22	10 21	16 21	14 05	15 72
Group	11 12	11 02	11 12	14 14	9 73	11 62	15 60	13 32	14 36
The Province	14 87	11 52	12 64	12 09	7 99	9 75	15 54	11 88	12 82

VALUES PER ACRE—CORN, BUCKWHEAT, BEANS AND HAY.

TABLE XV. Showing by County Municipalities and groups of Counties the market value of crop per acre of Corn, Buckwheat, Beans and Hay and Clover in Ontario in 1890 in 1891, with the yearly average for seven years 1885-91.

Counties.	Corn.			Buckwheat.			Beans.			Hay and Clover.		
	1891.	1890.	'85-91.	1891.	1890.	'85-91.	1891.	1890.	'85-91.	1891.	1890.	'85-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	22 49	22 72	20 62	10 54	7 87	10 02	20 69	27 37	23 02	14 89	13 83	17 14
Kent	24 04	22 23	19 59	12 04	9 33	9 02	18 46	25 31	19 89	13 10	15 74	16 29
Elgin	25 88	18 61	20 53	10 80	9 20	8 77	21 54	24 67	22 20	12 51	15 18	15 98
Norfolk	22 70	15 19	17 74	10 72	9 03	8 50	22 39	20 82	18 52	12 39	13 59	13 43
Haldimand	23 76	14 58	19 26	8 60	9 80	7 62	21 43	19 66	19 19	7 62	13 44	12 57
Welland	25 88	14 55	19 07	12 52	9 20	9 19	18 04	15 42	16 07	11 20	15 26	13 48
Group	23 68	20 44	19 79	11 13	9 06	8 78	18 89	24 83	20 01	11 91	14 58	14 81
Lambton	26 12	18 73	19 08	11 20	6 67	8 43	19 73	15 93	18 34	14 17	14 15	15 52
Huron	19 53	17 87	20 04	12 35	8 60	8 63	26 53	32 13	26 81	10 72	15 11	14 74
Bruce	17 35	13 12	15 69	10 72	6 02	7 69	29 17	23 13	22 16	7 98	13 36	13 19
Group	23 82	17 81	18 91	11 27	6 80	8 21	21 85	19 88	20 61	10 55	14 22	14 35
Grey	12 44	15 25	13 56	8 51	8 04	7 45	23 87	25 70	21 15	10 84	15 11	12 99
Simcoe	21 77	18 61	17 26	8 25	7 87	7 37	22 92	23 13	21 39	12 03	12 96	13 40
Group	17 09	16 60	15 51	8 36	7 94	7 41	23 44	25 23	21 25	11 33	14 23	13 15
Middlesex	27 24	19 12	19 65	11 16	8 69	7 56	21 86	24 42	20 58	14 53	16 06	16 04
Oxford	24 79	17 93	18 49	10 10	7 31	7 60	18 57	21 20	23 63	16 08	17 33	16 52
Brant	25 88	22 05	19 97	9 97	8 34	8 14	19 10	23 90	17 31	14 17	18 21	14 49
Perth	22 39	16 78	18 61	11 03	10 75	8 10	23 85	32 13	24 07	12 98	17 49	16 09
Wellington	19 28	18 30	17 50	8 51	10 75	9 54	21 24	25 70	19 74	12 74	15 90	15 40
Waterloo	23 17	19 31	18 49	9 09	8 60	8 15	21 25	25 70	21 66	10 00	15 58	15 28
Dufferin	15 55	15 25	14 92	11 03	8 60	9 12	22 28	25 70	22 94	13 93	14 55	13 55
Group	25 34	19 00	19 16	10 06	8 62	8 04	20 96	23 87	20 93	13 61	16 45	15 59
Lincoln	25 44	13 15	18 56	11 42	9 89	9 24	20 79	25 70	22 14	11 31	15 90	14 15
Wentworth	25 56	19 52	20 46	12 30	8 56	9 22	22 07	21 20	22 53	10 96	18 05	14 18
Halton	26 75	21 87	19 28	9 88	8 60	6 34	26 57	22 49	20 08	9 53	13 91	12 71
Peel	23 33	18 30	18 82	11 03	10 75	8 40	21 21	22 49	22 47	11 91	14 71	13 78
York	21 77	18 30	19 22	10 49	6 02	8 46	25 25	32 13	24 66	12 62	14 07	13 79
Ontario	20 22	16 26	16 59	10 85	9 16	10 39	18 14	22 23	21 46	13 10	14 15	14 33
Durham	22 17	15 77	15 35	10 32	9 33	9 60	26 10	23 52	20 03	11 91	15 18	14 18
Northumberland	20 59	15 77	15 31	10 50	9 03	9 01	21 86	20 82	22 46	8 69	12 56	12 60
Prince Edward	19 47	18 64	15 53	10 01	10 58	9 92	17 30	23 39	19 20	12 74	12 56	13 74
Group	22 55	17 13	17 44	10-41	9 55	9 46	21 75	22 72	21 28	11 50	14 49	13 73
Lennox and Addington	23 64	16 93	17 62	10 54	11 05	9 99	25 89	27 37	21 99	12 39	11 93	12 22
Frontenac	21 46	16 78	16 34	11 11	11 35	10 19	20 16	23 90	23 50	11 20	13 36	11 66
Leeds and Grenville	27 12	20 25	20 69	10 94	10 62	9 53	24 30	26 34	23 24	8 22	12 00	12 89
Dundas	26 34	17 96	20 09	11 51	13 20	11 62	26 31	32 13	26 03	11 31	11 93	16 12
Stormont	23 48	22 88	19 62	12 30	12 17	11 54	31 83	27 63	26 57	11 91	10 97	16 17
Glengarry	22 55	22 51	19 38	11 07	9 63	9 55	18 57	25 70	23 45	7 74	10 57	16 50
Prescott	27 80	22 94	19 89	10 05	8 26	8 87	24 83	22 49	22 71	14 05	11 69	15 12
Russell	24 10	17 78	17 14	12 74	11 01	10 29	22 17	23 13	20 87	12 98	10 73	13 71
Carleton	22 30	15 40	16 58	11 86	9 63	9 31	25 36	29 56	23 02	11 67	10 26	14 10
Renfrew	18 32	13 73	14 91	10 94	9 93	9 56	21 86	25 44	25 24	8 22	10 57	10 50
Lanark	16 08	19 06	14 72	11 55	9 50	8 97	24 09	24 80	25 14	9 53	11 29	13 65
Group	24 17	19 00	18 68	11 25	10 60	9 78	24 12	26 41	23 82	10 39	11 52	13 43
Victoria	15 55	18 30	17 90	8 07	9 76	8 14	24 62	29 94	23 28	9 29	11 37	11 52
Peterborough	16 48	16 01	14 09	7 85	11 22	8 62	21 85	25 70	17 27	7 74	12 96	10 85
Haliburton	16 05	12 20	14 07	11 38	11 09	8 63	25 46	25 70	20 90	6 43	9 30	10 52
Hastings	21 77	15 49	15 88	11 38	9 59	9 65	15 91	29 43	21 00	7 74	13 59	12 00
Group	20 73	15 70	15 92	9 62	10 02	9 19	19 58	27 99	20 40	8 05	12 62	11 50
Muskoka	12 44	11 16	11 46	11 95	9 85	10 68	21 22	28 91	22 95	6 55	14 71	12 44
Parry Sound	14 00	12 20	12 87	8 78	12 38	9 63	21 21	25 70	22 24	9 65	11 93	11 11
Nipissing	15 21	11 68	14 47	10 76	11 05	10 94	22 50	26 60	23 33	8 10	13 91	11 08
Algoma	22 08	12 20	14 26	10 32	8 60	9 43	16 00	25 70	22 06	6 91	13 91	12 16
Group	14 77	11 53	12 40	10 89	10 27	10 28	21 63	26 86	22 69	7 72	13 71	12 01
The Province	23 59	19 09	18 97	10 66	9 80	9 37	19 70	24 80	20 61	11 18	13 90	13 94

VALUES PER ACRE—POTATOES, CARROTS AND TURNIPS.

TABLE XVI. Showing by County Municipalities and groups of Counties the market value per acre of Potatoes, Carrots and Turnips in Ontario in the years 1890 and 1891, with the yearly average for seven years 1885-91.

Counties.	Potatoes.			Carrots.			Turnips.		
	1891.	1890.	'85-91.	1891.	1890.	'85-91.	1891.	1890.	'85-91.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	31 26	35 17	36 01	33 88	106 47	65 69	23 00	96 00	59 05
Kent	41 99	42 75	42 73	48 37	101 75	82 08	43 90	91 65	77 44
Elgin	46 39	37 30	40 15	61 62	112 46	90 27	53 50	89 60	77 42
Norfolk	40 23	31 67	32 24	44 00	78 44	72 65	47 30	83 97	79 29
Haldimand	32 66	31 19	41 02	29 50	100 49	73 96	32 80	89 60	60 78
Welland	34 46	28 13	34 13	36 12	68 36	78 36	38 10	62 21	72 86
Group	38 77	35 00	37 58	45 82	95 93	78 37	44 37	85 28	75 54
Lambton	41 04	35 97	39 14	44 25	104 58	81 86	42 70	79 36	64 78
Huron	53 04	52 27	51 20	52 63	120 02	100 33	56 70	115 71	90 46
Bruce	56 59	50 59	51 87	45 38	106 79	84 78	53 60	109 57	90 15
Group	51 38	46 08	48 66	48 65	111 55	91 54	54 77	112 06	89 69
Grey	51 74	70 79	57 95	44 13	114 03	95 10	56 00	105 73	87 98
Simcoe	49 78	58 87	54 46	50 88	115 61	94 09	57 80	117 76	89 79
Group	50 68	64 59	56 18	47 66	114 80	94 57	56 55	108 93	88 49
Middlesex	50 89	42 09	41 66	61 88	110 88	86 31	61 60	87 81	81 27
Oxford	53 69	40 00	42 77	60 50	112 77	98 59	64 00	107 78	94 34
Brant	49 94	48 29	44 74	58 25	142 38	112 46	65 30	113 66	96 78
Perth	52 88	57 24	48 10	56 75	124 11	104 35	60 10	109 31	87 98
Wellington	50 99	58 96	52 14	51 75	115 29	83 23	60 50	104 96	93 80
Waterloo	49 72	53 74	49 56	57 37	122 54	101 89	54 90	103 94	87 33
Dufferin	52 23	61 05	57 85	39 11	98 60	92 03	55 90	101 89	82 74
Group	51 50	51 83	48 12	58 04	117 94	96 01	60 39	105 56	91 11
Lincoln	41 79	35 53	40 19	43 25	102 38	85 97	43 90	92 16	78 09
Wentworth	46 32	41 15	46 57	51 50	123 48	91 14	58 00	128 77	103 74
Halton	38 57	42 44	44 13	49 87	115 92	109 18	56 40	131 33	95 91
Peel	39 61	38 01	40 54	35 75	108 05	82 71	48 80	114 18	77 03
York	45 48	46 60	44 87	49 50	127 26	110 23	51 20	108 54	86 13
Ontario	49 81	45 10	52 74	50 50	137 03	113 44	54 40	125 44	92 84
Durham	49 45	43 46	50 53	53 75	102 06	99 58	54 60	106 50	90 95
Northumberland	42 67	44 96	42 47	42 00	113 09	89 22	48 10	115 20	88 39
Prince Edward	43 42	34 64	39 58	28 13	90 09	58 97	38 00	97 54	59 01
Group	44 98	42 78	45 25	46 86	118 47	99 51	53 26	118 79	91 36
Lennox and Addington	45 05	38 23	47 71	45 25	114 35	77 02	40 70	68 35	59 01
Frontenac	50 79	37 21	40 80	43 00	60 17	64 60	35 50	67 58	61 23
Leeds and Grenville	52 58	45 14	49 99	40 12	97 65	77 19	45 10	91 90	74 92
Dundas	57 38	73 10	58 15	62 37	126 00	76 54	49 20	72 45	65 78
Stormont	39 38	48 73	47 37	45 88	78 75	59 58	56 30	97 28	71 48
Glengarry	46 00	49 04	47 05	41 25	78 75	56 90	55 00	134 40	90 58
Prescott	60 99	72 25	59 63	45 26	94 82	75 96	50 40	83 97	81 44
Russell	48 77	54 49	45 12	50 00	96 39	83 14	48 30	105 73	92 48
Carleton	55 58	56 79	55 16	45 25	97 65	79 99	52 30	97 28	77 91
Renfrew	58 42	57 77	63 43	41 37	122 22	71 09	45 70	85 25	68 82
Lanark	53 63	55 95	56 39	39 38	131 36	84 93	48 50	96 51	76 01
Group	52 51	51 75	52 23	45 38	99 76	76 24	47 46	93 98	74 97
Victoria	48 41	61 53	54 43	50 00	102 69	101 03	47 60	89 60	82 78
Peterborough	43 52	48 86	49 08	44 50	129 78	85 37	48 50	102 40	73 88
Haliburton	55 16	54 05	54 15	37 26	107 10	78 52	36 90	78 59	65 75
Hastings	46 29	43 19	50 84	36 50	85 37	79 40	37 70	81 41	63 88
Group	46 60	50 27	51 57	43 51	110 24	89 42	45 80	91 43	76 90
Muskoka	55 26	56 17	59 19	44 12	78 75	67 85	38 50	96 26	70 43
Parry Sound	55 35	64 01	65 56	37 13	55 13	61 41	34 60	72 45	64 63
Nipissing	56 04	62 02	58 47	40 00	63 00	53 50	38 90	76 80	50 80
Algoma	65 20	77 53	75 02	38 25	63 00	62 31	36 40	102 40	66 03
Group	57 86	64 67	64 89	40 32	68 90	64 96	36 46	88 58	67 25
The Province	48 95	49 21	48 93	48 36	110 74	90 66	54 61	108 44	88 32

VALUES PER ACRE—ALL FIELD CROPS.

TABLE XVII. Showing by County Municipalities and groups of Counties in Ontario the average market value in 1890 and 1891 of all field crops and by groups as in Table XI; also the yearly average of the first group for ten years 1882-91, of the second group for seven years 1885-91, and a yearly average of all crops derived from the aggregate in Table XII and corresponding acreage.

Counties.	Wheat, barley, oats, rye and peas.			Corn, buckwheat, beans, hay, potatoes, carrots and turnips.			All field crops.		
	1891.	1890.	1882-91.	1891.	1890.	1885-91.	1891.	1890.	Yearly average.
	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	18 59	12 24	15 51	18 66	18 98	19 45	18 63	15 62	17 53
Kent	20 47	14 54	16 05	18 08	20 62	18 79	19 27	17 51	17 34
Elgin	20 77	13 83	15 46	16 82	17 40	18 22	19 00	15 34	16 64
Norfolk	18 07	12 10	13 48	16 13	16 02	16 30	17 25	13 67	14 64
Haldimand	13 73	10 41	12 72	8 63	14 20	13 68	11 79	11 77	13 09
Welland	16 59	10 78	12 83	13 66	15 72	14 93	15 00	13 39	13 95
Group	18 32	12 55	14 52	16 03	17 69	17 26	17 25	14 86	15 76
Lambton	18 94	11 85	14 62	17 10	16 14	17 30	18 18	13 44	15 66
Huron	18 58	14 32	14 96	15 51	22 13	21 11	17 44	17 09	17 07
Bruce	16 99	14 55	14 21	13 12	19 90	19 52	15 49	16 62	16 16
Group	18 10	13 81	14 62	15 06	19 91	19 63	16 93	16 07	16 43
Grey	15 35	12 80	13 19	16 01	24 16	20 48	15 62	17 34	15 99
Simcoe	17 76	13 32	14 67	17 20	20 85	20 00	17 58	15 55	16 25
Group	16 58	13 07	13 92	16 50	22 84	20 29	16 55	16 49	16 11
Middlesex	20 33	14 78	15 40	18 44	19 42	18 92	19 60	16 50	16 68
Oxford	20 03	14 55	15 55	22 18	24 61	23 43	20 87	18 45	18 51
Brant	18 58	14 32	14 96	21 73	27 76	23 09	19 71	19 14	17 81
Perth	20 32	15 17	15 80	18 28	24 94	22 14	19 62	18 56	17 93
Wellington	17 03	13 85	14 56	20 46	28 94	27 15	18 31	19 24	19 05
Waterloo	18 82	14 92	15 95	17 07	26 40	24 71	18 28	18 44	18 70
Dufferin	16 02	12 42	13 52	19 99	24 98	21 50	17 30	16 15	16 09
Group	18 87	14 37	15 17	19 70	24 91	22 98	19 17	18 07	17 90
Lincoln	15 62	11 47	13 77	14 50	16 83	16 05	15 08	13 97	14 90
Wentworth	16 95	12 42	14 53	17 33	26 19	21 39	17 11	17 73	17 25
Halton	16 34	12 51	14 84	14 15	21 50	18 56	15 53	15 44	16 16
Peel	16 76	13 00	15 22	15 69	20 38	18 22	16 45	14 76	16 03
York	18 35	13 13	15 82	17 23	23 02	20 35	17 97	15 95	17 15
Ontario	17 81	11 00	14 87	23 08	33 90	30 38	19 49	18 36	19 56
Durham	16 27	9 97	13 88	18 26	24 77	24 12	16 91	14 52	16 77
Northumberland	14 09	10 68	12 02	13 56	18 83	17 99	13 88	13 71	14 09
Prince Edward	13 56	11 21	11 04	14 40	14 41	14 82	13 91	12 46	12 41
Group	16 57	11 75	14 21	16 81	22 88	20 74	16 66	15 44	16 36
Lennox and Addington	13 67	9 53	11 60	14 39	13 31	14 24	14 06	11 44	12 76
Frontenac	14 36	9 71	11 69	13 83	15 06	13 80	14 06	12 55	12 78
Leeds and Grenville	15 05	9 44	12 31	12 36	14 62	15 35	13 46	12 43	14 02
Dundas	16 97	10 72	13 99	15 37	15 54	18 64	16 10	13 29	16 30
Stormont	16 05	11 68	13 35	14 35	13 62	17 82	15 08	12 80	15 75
Glengarry	15 12	9 78	12 20	10 83	13 19	18 24	12 97	11 52	15 10
Prescott	15 44	10 87	11 88	17 14	14 79	17 90	16 34	12 78	14 75
Russell	16 81	11 99	12 59	17 01	16 47	17 57	16 90	13 95	14 79
Carleton	19 93	11 48	13 86	16 44	17 91	19 11	18 41	14 17	16 01
Renfrew	15 19	11 41	12 80	11 83	14 19	14 12	13 70	12 54	13 37
Lanark	16 54	10 49	12 56	12 62	14 43	16 06	14 60	12 36	14 29
Group	16 08	10 57	12 62	13 85	14 82	16 21	14 93	12 68	14 35
Victoria	16 28	12 08	13 46	14 25	20 30	20 31	15 60	14 52	15 39
Peterborough	14 22	11 42	12 51	11 81	19 47	15 79	13 34	14 06	13 57
Haliburton	12 69	10 90	10 78	10 09	13 98	14 52	11 19	12 50	12 92
Hastings	13 60	11 19	11 95	11 70	16 02	15 27	12 69	13 29	13 27
Group	14 69	11 56	12 59	12 29	17 79	16 61	13 71	13 84	13 99
Muskoka	13 26	11 52	11 45	11 12	19 65	17 70	11 96	16 46	15 45
Parry Sound	11 87	10 97	11 94	14 15	18 22	17 69	13 25	15 15	15 30
Nipissing	13 00	12 17	12 60	14 78	19 12	16 91	14 11	16 67	15 67
Algoma	15 01	13 03	15 55	11 65	20 69	18 31	13 36	16 66	16 82
Group	13 51	11 99	13 22	12 49	19 51	17 83	12 93	16 21	15 85
The Province	17 17	12 54	14 07	15 87	19 87	19 09	16 63	15 42	16 01

FARM WAGES.

TABLE XVIII. Showing by County Municipalities and groups of Counties the average wages of Farm Laborers and Domestic Servants in Ontario in 1890 and 1891.

Counties.	Farm laborers.								Domestics per month with board.	
	Per year—				Per month in working season—					
	With board.		Without board.		With board.		Without board.			
	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.	1891.	1890.
	$	$	$	$	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Essex	163	159	268	253	17 22	16 60	26 70	26 53	6 87	6 71
Kent	166	161	254	256	17 08	17 49	26 10	27 39	6 95	6 81
Elgin	165	158	259	244	17 03	16 89	25 64	25 47	6 34	6 51
Norfolk	154	151	236	235	15 48	15 39	22 96	23 97	5 69	5 63
Haldimand	149	145	251	241	16 79	16 83	25 18	25 67	6 44	6 32
Welland	147	146	249	250	16 19	16 37	24 28	26 93	6 14	6 47
Group	158	154	253	247	16 66	16 65	25 29	25 94	6 39	6 40
Lambton	157	160	274	263	17 46	17 18	26 73	28 21	6 55	6 66
Huron	161	154	252	252	17 02	16 48	26 20	26 15	6 39	6 21
Bruce	157	153	260	256	16 99	16 56	26 00	27 08	6 01	5 83
Group	159	155	260	256	17 13	16 72	26 28	27 04	6 30	6 18
Grey	150	158	254	253	16 56	16 58	26 53	26 32	5 80	5 75
Simcoe	158	152	272	263	18 37	16 92	27 24	26 10	6 22	5 81
Group	153	156	262	257	17 34	16 73	26 86	26 23	5 97	5 77
Middlesex	155	154	257	261	16 11	16 74	24 81	26 90	6 62	6 47
Oxford	155	161	236	248	16 41	16 42	25 29	25 06	6 67	6 39
Brant	154	156	247	250	16 12	16 51	23 84	25 17	6 64	6 50
Perth	157	154	246	240	16 86	16 77	25 53	27 22	6 44	6 33
Wellington	167	160	266	252	17 00	16 38	26 40	26 69	6 33	6 37
Waterloo	154	153	256	251	15 88	15 81	25 62	25 67	6 19	6 13
Dufferin	159	158	251	255	16 43	17 39	27 41	27 82	6 18	6 17
Group	157	157	250	251	16 43	16 54	25 40	26 24	6 46	6 36
Lincoln	159	149	258	245	16 75	17 14	25 26	26 35	6 02	6 03
Wentworth	153	153	256	251	16 97	16 72	26 06	26 59	6 71	6 62
Halton	174	158	279	277	17 13	17 08	26 88	27 81	7 33	7 03
Peel	163	162	277	256	17 96	17 55	27 25	27 10	7 22	6 97
York	167	169	272	264	17 20	17 49	26 80	27 26	6 88	7 04
Ontario	155	166	268	251	16 17	17 15	26 66	27 17	6 12	6 27
Durham	163	154	255	275	15 82	16 01	24 52	26 10	6 36	6 41
Northumberland	160	150	254	245	15 84	16 14	25 20	24 47	6 13	5 69
Prince Edward	163	151	230	218	16 90	15 61	23 95	23 56	5 36	5 48
Group	162	159	262	254	16 76	16 87	25 90	26 34	6 50	6 42
Lennox and Addington	158	155	231	227	16 13	16 48	23 66	24 03	5 08	5 44
Frontenac	150	151	223	254	16 24	17 06	24 57	26 58	5 84	5 95
Leeds and Grenville	156	153	257	243	15 47	16 50	25 10	25 29	6 22	6 57
Dundas	147	148	250	291	15 35	17 47	26 00	29 69	6 30	6 72
Stormont	166	153	252	238	17 86	17 05	26 44	27 15	5 88	6 13
Glengarry	139	151	255	249	15 62	16 95	25 13	27 18	6 10	6 33
Prescott	158	179	251	279	16 34	18 05	23 50	27 68	5 15	4 80
Russell	166	159	249	253	16 73	17 35	26 71	26 76	5 22	5 08
Carleton	150	162	288	261	15 54	17 17	27 41	27 83	6 35	7 08
Renfrew	159	160	285	255	15 57	17 50	25 90	28 87	5 51	5 31
Lanark	149	161	256	254	16 42	17 25	25 86	27 19	5 87	6 59
Group	154	159	254	253	15 99	17 17	25 20	26 86	5 76	6 00
Victoria	159	168	259	263	14 06	17 45	26 96	25 77	5 78	6 19
Peterborough	178	157	270	272	17 21	16 46	27 10	25 75	6 50	6 40
Haliburton	165	153	255	228	17 14	17 69	26 56	26 41	5 63	4 87
Hastings	161	158	250	249	15 70	16 26	24 46	25 19	5 60	5 69
Group	166	160	258	258	15 82	16 77	25 78	25 68	5 90	5 93
Muskoka	166	159	262	252	17 60	19 53	26 76	28 33	6 27	6 46
Parry Sound	173	173	273	298	18 31	18 85	26 86	29 04	5 63	5 85
Nipissing	181	188	298	297	18 31	20 61	28 60	32 28	6 00	6 22
Algoma	166	181	274	257	18 65	20 19	27 20	29 68	6 36	7 24
Group	169	174	273	280	18 19	19 74	27 12	29 59	6 13	6 40
The Province	158	157	257	253	16 66	16 88	25 81	26 56	6 25	6 23

ANNUAL REPORT

OF THE

BUREAU OF INDUSTRIES

FOR THE

PROVINCE OF ONTARIO

1891

PART IV. LOAN AND INVESTMENT COMPANIES.
PART V. CHATTEL MORTGAGES.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO
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1892.

TENTH ANNUAL REPORT

OF THE

BUREAU OF INDUSTRIES.

PARTS IV AND V.

To the Honorable John Dryden, Minister of Agriculture:

Sir,—I have the honor to present herewith Parts iv and v of the tenth annual report of the Bureau of Industries, being a statement of the affairs of Loan and Investment Companies and a return by County Court Clerks of Chattel Mortgages on record in Ontario for the year ending Dec. 31, 1891.

I have the honor to be, Sir,

Your obedient servant,

C. C. JAMES,

Secretary.

Toronto, Sept. 5, 1892.

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PART IV.

LOAN AND INVESTMENT COMPANIES OF ONTARIO.

STATEMENT OF AFFAIRS.

This report contains the returns received from seventy-one Loan, Building and Investment Companies for the year 1891. In the report for 1890 the returns of sixty-seven similar companies were given. Three companies have disappeared as follows: The Empire Loan Co. of Canada has been sold to the Dominion Savings and Investment Co. of London; the Canada Landed Credit Co. and the National Investment Co. of Toronto have amalgamated; the Dominion Investment Loan and Savings Co. of Ottawa has been wound up. Reports have been received and are here included for the first time from the following: Brockville Loan and Savings Co, Brockville; Home Building and Savings Association, Ottawa; the Industrial Mortgage and Savings Co, Sarnia; the Canadian Mutual Loan and Investment Co., Toronto; the Dominion Building and Loan Association, Toronto; the Toronto Savings and Loan Co., Toronto; the Toronto General Trusts Co, Toronto. Some of the companies are incorporated under Dominion and Imperial charters, and to them our thanks are specially due for reports here included.

The following table gives the subscribed capital, also the assets and liabilities of the 71 companies for 1891, arranged according to the principal headquarters. For comparison there are also given the similar totals for the previous four years:

Location of head office of company.	No. of Cos.	Capital subscribed.	Liabilities to stock holders.	Liabilities to the public	Total liabilities or assets.	Secured loan assets.	Property assets.
		$	$	$	$	$	$
Hamilton...	3	2,507,200	2,344,802	3,370,062	5,714,864	5,262,244	452,620
Kingston...	2	450,000	510,302	502,580	1,012,882	844,201	168,681
London	8	10,465,500	7,880,790	9,912,231	17,793,021	16,320,900	1,472,121
Ottawa.....	3	622,600	469,514	48,194	517,708	410,940	106,768
St. Thomas.	5	1,958,050	1,214,163	825,176	2,039,339	1,902,136	137,203
Sarnia	3	1,160,000	1,243,309	1,126,825	2,370,134	2,217,738	152,396
Stratford...	2	572,400	396,640	502,092	898,732	884,407	14,325
Toronto	30	52,276,867	25,660,597	50,085,423	75,746,020	66,113,101	9,632,919
Other places	15	6,140,200	4,659,280	6,384,566	11,043,846	10,109,358	634,488
Totals:							
1891	71	76,152,817	44,379,397	72,757,149	117,136,546	104,365,025	12,771,521
1890	67	70,672,710	42,673,552	65,544,199	108,217,751	98,111,032	10,106,719
1889	71	69,694,221	41,629,987	62,967,156	104,597,143	94,666,887	9,930,256
1888	64	67,939,559	40,108,161	59,540,175	99,648,336	89,042,199	10,606,146
1887	55	56,114,310	35,910,563	51,177,104	87,087,667	79,035,804	8,051,863

Comparing the reports of 1887 and 1891 it will be seen that the tendency has been toward the formation of larger companies. The 55 companies in 1887 had an authorised capital of $79,575,583, and the 71 of 1891 had an authorised capital of $164,837,249. The number of companies increased by 29 per cent., while the authorised capital increased

by 107 per cent. and the subscribed capital by 36 per cent. This is due partly to the amalgamation of companies, partly to the formation of new companies larger than the previous average, and partly to the development and growth of old companies. The 54 companies that have reported for the five years 1887-91, according to a subsequent table, show an increase in capital subscribed of $4,332,707. In 1887 out of the 55 companies, 19 had headquarters at Toronto, with a subscribed capital of $36,434,944; in 1891 out of the 71 companies 30 had headquarters at Toronto, with a subscribed capital of $52,276,867. The total increase reported amounted to $20,038,507, of which the Toronto companies contributed 79 per cent. or $15,841,923.

The amount paid on stock, fully paid and partially paid, in 1887 was 47.7 per cent. of subscribed capital; in 1891 it amounted to 42.5 per cent. The capital subscribed therefore has increased somewhat more rapidly than the payment of stock. The number of companies reporting in 1891 was the same as the number reporting in 1889, but the capital subscribed has increased by $6,458,596, the amount paid on stock by $1,136,855 and the total liabilities to stockholders by $2,749,440 in the same time.

Of the liabilities to the public there has been since 1887 an increase of $21,580 045, due principally to debentures payable outside of Canada. The deposits increased $1,073,362 during the year, but were only $643,352 greater than in 1887. The debentures payable in Canada have increased since 1887 by $2,410,054, those payable outside of Canada by $14,311,179. The amount owing to banks was only $91,480, the lowest reported to us for the five years.

The total assets show an increase of $8,918,795 over 1890 and of $30,047,879 over 1887. The increase in four years has been 34 5 per cent. The secured loan assets on real estate apart from that absolutely foreclosed have increased $6,064,868 from 1890 and $26,048,482 from 1887. The assets in the shape of municipal and school section securities have slightly increased over 1890, but are $80,607 less than in 1887. Cash on hand and in banks was $1.347,044 greater than in 1890, and $1,890,987 greater than in 1887. Office premises show a steady growth in value. The real estate absolutely foreclosed, according to the returns, has decreased during the past two years, by $194,585 during 1890 and by $140,412 during 1891. During 1891, however, the secured loan assets of real estate held under power of sale increased by $375,041, and the amount chargeable against mortgaged property held for sale by $445,703.

In harmony with the general reduction in the rate of interest paid by banks and received from investments during the past year the average rate of dividend has declined; in 1887 it was 7.55 per cent.; in 1888, 7.28; in 1889, 7.06; in 1890, 7.21; and in 1891 it dropped to 7.12. Owing to the increased amount of money invested, however, the dividends declared have yearly increased from $2,021,207 in 1887 to $2,309,701 in 1891.

The amount of money loaned in 1891 was greater than in 1890, but less than in 1889. The table giving the returns of the 54 companies that have reported for the five years shows, however, that in 1891 they loaned less than during any other year; the increase in loans must consequently be due to the companies lately formed or to those reporting for the first time since 1887. The average amount loaned by these companies for the five years was $17.732,133, whereas in 1891 they loaned only $16,797,699, showing a decrease in 1891 of $1,062,767 below the five years' average, and of $465,329 below 1890. The decrease is entirely due to the Toronto companies. While the total decrease of loans of these 54 companies was in 1891 $465,329 below 1890, the 20 Toronto companies decreased their loans at same time by $1,125,781.

	Total loans.		Average
	1891.	1890.	1887-91.
20 Toronto Companies.	$9,820 001	$10,945,782	$10,882,768
34 Other "	6,977,698	6,317,246	6,849,365

From the returns of all the companies reporting it will be seen that the amount received from borrowers (principal and interest) increased $1,626,655 over 1890. There was received from depositors during the year $744,170 more than was repaid. The cost of management was $30,191 more than in 1890 and $191,206 more

than in 1887. The total amount invested and secured by mortgage shows an increase over 1890 of $6,127,819, and over 1887 of $25,785,513. The following statement gives the percentage growth of business from 1890 to 1891 and from 1887 to 1891, first in regard to all the companies reporting from year to year, second in regard to the 54 companies reporting every year. (By amalgamation the 54 companies of 1887 became 52 in 1891.)

	All companies.		54 companies.	
	Increase over—		Increase over—	
	1890.	1887.	1890.	1887.
	%	%	%	%
No. of Companies	5.9	29.1	.....	.....
Capital subscribed	7.8	35 7	—1.5	7.7
Amount paid on stock	0.5	17.1	0.2	7.5
Reserve Fund	6.2	36.0	3.4	27.5
Total liabilities to stockholders	4.0	26.4	0.8	11.2
Deposits at end of year	6.2	3.7	4.5	0.8
Debentures payable at end of year	6.2	51.9	5 6	32 2
Total liabilities to public	11.0	42.1	4.5	21.4
Loans secured on real estate	6.4	34.6	1.9	18.4
Cash on hand	45.4	85.9	37.5	62.3
Total assets	8 2	34.5	3.4	17.2
Dividends declared (amount)	3.0	13.7	0.3	6.3
Loans during year	3.1	11.4	—2.7	—2.1
Received from borrowers	7.9	16.4	4.3	5.0
Interest paid and accrued	5.3	29.3	4.8	15.6
Amount chargeable against mortgaged property held for sale	14.8	57.6	13.5	36.1
Cost of management	3.6	27.9	—1.2	10.6

LOAN AND INVESTMENT COMPANIES.

List of Companies reporting Statement of Affairs as required by Vict. 54, Chapter 38, Section 23.

Name of Company.	When Organised.	President.	Manager.	Head Office.	For year ending
Barrie Loan and Savings Company	April 14, 1881.	N. Dyment	Robert Laidlaw	Barrie	Dec. 31, 1891.
Hastings Loan and Investment Society	January, 1876.	Hon. Mackenzie Bowell	J. P. C. Phillips	Belleville	Dec. 31, 1891.
Brockville Loan and Savings Company	July 1, 1885.	D. B. Jones	G. H. Weatherhead	Brockville	Dec. 31, 1891.
Royal Loan and Savings Company	June 1, 1876.	T. S. Shenston	R. S. Schell	Brantford	Dec. 31, 1891.
Chatham Loan and Savings Company	Sept. 28, 1881.	Archibald Bell	S. F. Gardiner	Chatham	Dec. 31, 1891.
Huron and Bruce Loan and Investment Company	June, 1885.	Joseph Williams	Horace Horton	Goderich	Dec. 31, 1891.
Guelph and Ontario Investment and Savings Society	.....1876.	David Stirton	William Ross	Guelph	Dec. 31, 1891.
Hamilton Homestead Loan and Savings Society	January 1, 1883.	James E. O'Reilly	I. A. Studdart	Hamilton	Dec. 31, 1891.
Hamilton Provident and Loan Society	Sept., 1871.	George H. Gillespie	H. D. Cameron	Hamilton	Dec. 31, 1891.
Landed Banking and Loan Company	February, 1877.	Matthew Leggat	C. W. Cartwright	Hamilton	Dec. 31, 1891.
Frontenac Loan and Investment Society	December, 1863.	Sir R. J. Cartwright	Thomas Briggs	Kingston	Dec. 31, 1891.
Ontario Building and Savings Society	June 26, 1874.	C. V. Price	James McArthur	Kingston	Dec. 31, 1891.
Agricultural Savings and Loan Company	May, 1872.	William Glass	W. A. Lipsey	London	Dec. 31, 1891.
Canadian Savings and Loan Company	October, 1875.	Robert Fox	H. W. Blinn	London	May 31, 1891.
Dominion Savings and Investment Society	April, 1872.	Robert Reid	H. E. Nelles	London	Dec 31, 1891.
Huron and Erie Loan and Savings Company	.....1864.	John W. Little	George A. Somerville	London	Dec. 31, 1891.
London Loan Company	.....1877.	Thomas Kent	Malcolm John Kent	London	Dec. 31, 1891.
Ontario Investment Association	April, 1880.	John Wright	A. T. McMahen	London	Dec. 31, 1891.
Ontario Loan and Debenture Company	.....1870.	Joseph Jeffery	William F. Bullen	London	Dec. 31, 1891.
Royal Standard Loan Company	August, 1877.	George Taylor	D. McMillan	London	Dec. 31, 1891.
Orangeville Building and Loan Association	.....1873.	F. C. Stewart	Francis Irwin	Orangeville	Dec. 31, 1891.
Ontario Loan and Savings Company	February, 1873.	W. F. Cowan	T. H. McMillan	Oshawa	Dec. 31, 1891.
Home Building and Savings Association	Sept. 1890	John R. Armstrong	C. A. Douglas	Ottawa	Aug. 31, 1891.
Metropolitan Loan and Savings Company	August, 1870.	H. V. Noel	C. R. Cunningham	Ottawa	Dec. 31, 1891.
Ottawa Building and Loan Society	June 6, 1884.	A. Smirle	C. A. Douglas	Ottawa	May 31, 1891.
Owen Sound, Grey and Bruce Loan and Savings Company	April 15, 1889.	William Roy	W. P. Telford	Owen Sound	Dec. 31, 1891.
Central Canada Loan and Savings Company	April 1, 1884.	George A. Cox	Fred. G. Cox	Peterborough	Dec. 31, 1891.
Crown Savings and Loan Company	Jan. 30, 1882.	John H. Fairbank	John Fraser	Petrolea	Dec. 31, 1891.
Midland Loan and Savings Company	.....1873.	John Mulligan	George M. Furby	Port Hope	Dec 31, 1891.
Security Loan and Savings Company	March 15, 1870	Thomas R. Merritt	E. F. Dwyer	St. Catharines	Dec 31, 1891.
Atlas Loan Company	August, 1887.	George Scott	A. E. Wallace	St. Thomas	Dec. 31, 1891.
Elgin Loan and Savings Company	May 1, 1879	Edward Miller	George Rowley	St. Thomas	Dec. 31, 1891.
Southern Loan and Savings Company	.....1870.	Samuel Eccles	J. W. Stewart	St. Thomas	Dec. 31, 1891.
Southwestern Farmers' and Mechanics' Savings and Loan Society	Feb. 18, 1875.	E. W. Gustin	W. E. Leonard	St. Thomas	Dec. 31, 1891.
Star Loan Company	August 31, 1881.	Hon. David Mills	D. M. Tait	St. Thomas	Feb. 29, 1892
Huron and Lambton Loan and Savings Company	Nov., 1877.	James Flintoft	Michael Fleming	Sarnia	Dec. 31, 1891.
Industrial Mortgage and Savings Company	.....	J. F. Lister, M.P.	J. S. Symington	Sarnia	Dec. 31, 1891.

Lambton Loan and Investment Company	...1844.	Charles Mackenzie, M.P.P.	Robert S. Gurd	Sarnia	June 30, 1891.
British Mortgage Loan Company	October, 1877.	Hon. Thomas Badantyne.	William Buckingham	Stratford	Dec 31, 1891.
Stratford Building and Savings Society	August 22, 1889.	W. R. Tiffin	D. B. Buritt	Stratford	Sept. 30, 1891.
Bristol and West of England Canadian Land Mortgage and Investment Company	March 25, 1878.	Sir George W. Edwards. T. S. Stayner	Wm. Smith & Co.	Bristol, Eng. Toronto	Dec. 31, 1891.
British Canadian Loan and Investment Company	July 1, 1877.	A. H. Campbell	R. H. Tomlinson	Toronto	Dec 31, 1891.
Building and Loan Association	March 1, 1870.	Larratt W. Smith, Q.C.	Walter Gillespie	Toronto	Dec. 31, 1881.
Canadian Homestead Loan and Savings Association	Sept., 1886	John Hillock	A. J. Patteson	Toronto	Sept. 30, 1891.
Canadian Mutual Loan and Investment Company	June 14, 1890.	C. H. A. Williams	Arthur J. Jackson	Toronto	July 31, 1891.
Canada Landed and National Investment Company	...1858	John L. Blaikie	Andrew Rutherford	Toronto	Dec. 31, 1891.
Canada Permanent Loan and Savings Company	...1855	J. Herbert Mason	John Herbert Mason	Toronto	Dec. 31, 1891.
City and County Loan Association	Jan. 26, 1889.	Ambrose Kent	John C. Laidlaw	Toronto	Dec. 31, 1891.
Dominion Building and Loan Association	July 1, 1890	F. A. Hall	Joseph Blakeley	Toronto	April 30, 1891.
Dovercourt Land, Building and Savings Society	Dec. 16, 1885	James Brandon	James T. Locke	Toronto	Dec. 31, 1891.
Farmers' Loan and Savings Company	October, 1871.	William Mulock, M.P.	George S. C. Bethune	Toronto	April 30. 1891.
Freehold Loan and Savings Company	May, 1859	C. H. Gooderham	Hon. S. C. Wood	Toronto	April 30, 1891.
Home Savings and Loan Company	April, 25, 1877.	Hon. Frank Smith	James Mason	Toronto	Dec. 31, 1891.
Imperial Loan and Investment Company	Sept. 14, 1869	James Thorburn, M.D.	E. H. Kertland	Toronto	Dec. 31, 1891.
Land Security Company	December, 1873.	Major George Greig	Wm. Innes Mackenzie	Toronto	Dec 31, 1891.
London and Canadian Loan and Agency Company	Jan. 1, 1873	Sir W. P. Howland, C. B.	James Ferrier Kirk	Toronto	Aug. 31, 1891.
London and Ontario Investment Company	May 15, 1877.	Hon. Frank Smith	Alfred M. Cosby	Toronto	June 30, 1891.
North British Canadian Investment Company	Oct. 14, 1876.	Peter Sturrock	James L. Scarth	Glasgow, Scot. Toronto	Dec. 31, 1891.
North of Scotland Canadian Mortgage Company	Dec. 17, 1875.	James W. Barclay, M.P.	William Smith Osler & Hammond	Aberdeen, Scot. Toronto	Nov. 11, 1891.
Ontario Industrial Loan and Investment Company	January 5, 1880.	William Booth	E. T. Lightbourn	Toronto	Dec 31, 1891.
People's Loan and Deposit Company	March, 1875.	William Elliot	James Watson	Toronto	Dec. 31, 1891.
Real Estate Loan Company of Canada	December, 1879.	T. R. Wadsworth	B. Morton	Toronto	Dec. 31, 1891.
Scottish Ontario and Manitoba Land Company	Dec. 15, 1879.	Robert Young	James L. Scarth	Glasgow, Scot. Toronto	Dec. 31, 1891.
Sons of England Building, Loan and Savings Association	April 30, 1889.	S. B. Pollard, M. D.	F. J. Davis	Toronto	Dec. 31, 1891.
Toronto Land and Loan Company	May 27, 1881.	Arthur Harvey	W. C. Beddome	Toronto	Aug. 31, 1891.
Toronto Savings and Loan Company	June 15, 1885.	Robert Jaffray	A. E. Ames	Toronto	Dec. 31, 1891.
Toronto General Trusts Company	February, 1882.	Hon. Edward Blake, Q.C.	J. W. Langmuir	Toronto	Mch. 31, 1892.
Trust and Loan Company of Canada	October 1, 1851.	Charles Morrison	William B. B. Simpson Richard J. Evans	London, Eng. Toronto	Sept. 30, 1891.
Union Loan and Savings Company	March, 1865.	James McGee	William Maclean	Toronto	Dec. 31, 1891.
Western Canada Loan and Savings Company	March, 1863.	Hon. George W. Allan	Water S. Lee	Toronto	Dec. 31, 1891.
Oxford Permanent Loan and Savings Society	...1865.	William Grey	William Grey	Woodstock	Dec. 31, 1891.

LOAN AND INVESTMENT COMPANIES.

TABLE I. Statement of affairs showing the capital stock, liabilities and assets of 71 Loan and Investment Companies in the Province of Ontario for the year 1891, as required to be furnished by Chapter 169, Section 83, R. S. O. 1887, or by provisions of special charters; also a miscellaneous summary of the business transacted by each company during the year.

Schedule.	Barrie Loan, Barrie.	Hastings Loan, Belleville.	Royal Loan, Brantford.	Brockville Loan, Brockville.	Chatham Loan, Chatham.	Huron and Bruce Loan, Goderich.	Guelph and Ontario, Guelph.	Hamilton Provident, Hamilton.	Hamilton Homestead, Hamilton.	Landed Banking, Hamilton.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	250,000	250,000	500,000	500,000	1,000,000	500,000	1,000,000	1,500,000	1,000,000	700,000
Capital subscribed	250,000	225,000	500,000	250,000	333,300	233,200	600,000	1,500,000	307,200	700,000
Liabilities.										
Liabilities to Stockholders:										
Stock fully paid up			497,300			122,400	343,100	1,000,000		
Stock on which has been paid	117,500	202,585	1,836	124,145	138,862	46,207	50,000	100,000	75,722	627,700
Accumulating stock							1,969			23,553
Reserve fund	8,500	18,000	88,000	7,007	8,400		124,000	275,000		118,000
Dividends declared and unpaid	4,112	6,059	17,469			5,016	15,685	38,500		18,769
Contingent fund and unappropriated profits	1,243	3,132	8,725	500		2,376	2,436	26,485	31,735	9,338
Total	131,355	229,776	613,330	131,652	147,262	175,999	537,190	1,439,985	107,457	797,360
Liabilities to the public:										
Deposits	26,481	133,079	427,646	77,407	240,880	99,751	483,213	1,072,158		560,186
Debentures payable in Canada	15,066		281,161		1,423		524,546	162,167		293,230
Debentures payable elsewhere		48,667						*1,083,417		133,723
Interest on debentures due and accrued			4,546				12,227	11,811		5,857
Interest on deposits due and accrued			2,765	2,023		4,189	8,694			763
Owing to banks										
Other liabilities								44,956		1,794
Total	41,547	181,746	716,118	79,430	242,303	103,940	1,028,680	2,374,509		995,553
Assets.										
Secured loan assets:										
Real estate of—										
General borrowers	170,668	355,835	1,152,375	178,321	356,489	259,988	1,515,433	3,237,815	102,363	1,652,354
Directors and executive officers of company									1,000	1,863
Held under power of sale		22,500	16,772	16,389	14,636			165,779		36,226
Shareholders' stock		700	6,436	7,205			3,512	7,424		
Directors and officers of company on their stock			1,345					523		
Otherwise secured			433	243			2,140	54,991		1,906
Total	170,668	379,035	1,177,361	202,158	371,125	259,988	1,521,085	3,466,532	103,363	1,692,349

Property assets :											
Municipal and school section securities, cash value	....	....	....	....	....	....	....	6,656	104,601	....	13,505
Office furniture and fixtures	....	1,638	231	293	490	590	....	....	....	200	....
Cash on hand	177	1,557	1,861	367	2,198	1,852	....	....	5,778	....	14,146
Cash in banks	2,057	9,223	18,256	8,264	6,690	14,644	38,129	41,083	....	721	36,283
Special deposit in banks	....	20,069	130,000	....	....	....	....	....	100,000	....	25,000
Office premises	....	....	....	....	9,062	....	....	....	89,000	....	....
Real estate absolutely foreclosed	....	....	....	....	....	2,865	....	....	....	....	3,930
Real estate otherwise acquired	....	....	....	....	....	....	....	....	7,500	1,400	7,700
Other property	....	....	1,739	....	....	....	....	....	....	1,773	....
Total	2,234	32,487	152,087	8,924	18,440	19,951	44,785	347,962	4,094	100,564	
Grand total *assets or liabilities*	172,902	411,522	1,329,448	211,082	389,565	279,939	1,565,870	3,814,491	107,457	1,792,913	
Miscellaneous.											
Dividends declared in year { Rate per cent.	7.	6.	7.	6.	7.	6.	8.	7.	....	6.	
Dividends declared in year { Amount	8,225	11,982	34,860	7,372	9,129	9,941	30,602	77,000	....	39,126	
Loaned during the year	9,085	96,396	155,242	41,427	90,957	29,143	356,906	747,150	17,364	385,308	
Received from borrowers (principal and interest)	30,781	94,181	286,544	45,327	79,231	36,468	274,230	901,032	5,936	477,941	
Received from depositors	35,757	110,882	601,653	51,733	479,551	108,950	934,404	964,071	†24,861	1,196,440	
Paid depositors	40,268	133,879	671,151	50,273	470,182	103,218	836,288	945,231	†32,399	1,219,503	
Debentures issued	15,000	....	141,844	....	400	....	149,241	15,180	....	139,403	
Debentures repaid	....	....	101,069	....	100	....	127,183	89,373	....	76,557	
Debentures to mature within one year	15,000	....	93,590	....	1,000	....	35,955	198,958	....	72,191	
Average rate of interest { For debentures.	5.00	5.00	4.75	....	4 50	....	4.73	4.18	....	4.82	
Average rate of interest { For deposits	4.00	4.00	4.00	4.	4.00	4.25	4.00	3.86	....	4.07	
Interest paid and accrued { On debentures	329	2,433	17,051	....	46	....	21,798	51,731	....	21,060	
Interest paid and accrued { On deposits	1,842	4,494	19,832	3,014	9,131	4,189	17,619	40,020	....	18,953	
Cost of management	987	2,925	6,585	1,433	4,305	1,465	8,548	32,133	1,360	12,905	
Invested and secured by mortgage { In Ontario	170,668	378,335	1,169,147	194,710	371,125	259,988	1,515,433	3,275,321	‡103,363	1,429,610	
Invested and secured by mortgage { Elsewhere	....	....	....	....	....	....	....	128,273	....	260,833	
Mortages by instalments	528	....	23,379	28,372	64,281	259,988	204,032	2,340,334	....	48,809	
Mortgages at stated period	170,140	378,335	1,145,768	166,338	306,844	....	1,311,401	1,063,260	103,363	1,641,634	
Average interest on total amount secured by mortgage	6.75	6.85	6.32	6.50	6.90	6.50	6.28	6.42	....	6.78	
Average interest on amount loaned on mortgage in year	6.00	6.50	6.20	6.50	6.57	6.00	6.15	6.28	....	6.69	
Mortgages on which compulsory proceedings have been taken { Number	....	....	13	2	5	....	....	70	....	33	
Mortgages on which compulsory proceedings have been taken { Amount	....	....	27,009	3,291	14,382	....	....	127,025	....	58,806	
Value of mortgaged property held for sale	....	32,000	18,374	22,100	16,800	....	....	165,779	....	36,226	
Amount chargeable against such property	....	22,500	16,772	16,389	14,636	....	....	165,779	....	36,226	

*Including $378,383 debenture stock. †Members only for dues and withdrawals ‡In City of Hamilton only.

TABLE I. LOAN AND INVESTMENT COMPANIES.—*Continued.*

Schedule.	Frontenac Loan, Kingston.	Ontario Building, Kingston.	Agricultural Savings, London.	Canadian Savings, London.	Dominion Savings, London.	Huron and Erie Loan, London.	London Loan, London.	Ontario Investment, London.	Ontario Loan, London.	Royal Standard, London.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	Unlimited	250,000	1,000,000	Unlimited	1,000,000	2,500,000	Unlimited	3,000,000	Unlimited	1,000,000
Capital subscribed	200,000	250,000	630,200	750,000	1,000,000	2,500,000	679,700	2,665,600	2,000,000	240,000
Liabilities.										
Liabilities to Stockholders:										
Stock fully paid up	200,000	250,000	.....	.....	.....	1,000,000	.....	.....	1,000,000	.....
Stock on which has been paid	.....	.....	618,500	713,700	931,700	300,000	646,600	699,257	200,000	180,550
Accumulating stock	....	....	6,179	5,819	267	.....	2,151	....	...	3,098
Reserve fund	30,000	.....	105,000	187,500	10,000	602,000	67,000	.....	400,000	19,500
Dividends declared and unpaid	5,082	6,330	21,647	.....	.....	58,527	.....	.....	42,000	5,406
Contingent fund and unappropriated profits	4,612	14,278	1,426	22,214	25,225	3,433	329	.....	266	1,496
Total	239,694	270,608	752,752	929,233	967,192	1,963,960	716,080	699,257	1,642,266	210,050
Liabilities to the public:										
Deposits	274,876	226,162	559,641	691,095	669,357	1,296,990	645,848	1,881	470,233	178,672
Debentures payable in Canada	.....	....	204,670	127,286	90,911	531,819	100,476	.....	117,280	17,400
Debentures payable elsewhere	....	.....	159,680	36,500	874,709	1,210,959	68,863	.....	1,364,889	.....
Interest on debentures due and accrued	.....	.....	4,343	3,413	7,223	19,868	3,072	... .	15,957	435
Interest on deposits due and accrued	.....	.....	.....	.....	.....	497	.....	.....	.....	.....
Owing to banks	....	.....	....	.....	....	.....	... .	...	.....	.....
Other liabilities	27	1,515	1,451	63	225	.....	.....	†136,525	.....	.....
Total	274,903	227,677	929,785	858,357	1,642,425	3,090,133	788,259	438,406	1,968,359	196,507
Assets.										
Secured loan assets:										
Real estate of—										
General borrowers	329,699	352,882	1,517,024	1,638,197	2,291,682	4,754,119	1,332,553	293,291	3,355,967	319,405
Directors and executive officers of company	3,561	3,995	.....	.....	.....	.....	3,340	.....	724	2,083
Held under power of sale	42,632	49,172	24,485	27,195	206,359	6,500	21,179	17,703	25,539	21,400
Shareholders' stock	10,216	6,412	17,751	60,759	65,268	....	33,645	21,262	2,327	18,618
Directors and officers of company on their stock	24,921	10,593	.....	2,609	.....	.....	61,425	.....	10,606	8,599
Otherwise secured	.....	10,118	.....	611	21,065	.....	.....	132,140	.....	5,140
Total	411,029	433,172	1,559,260	1,729,701	2,584,374	4,760,619	1,452,142	464,396	3,395,163	375,245

Property assets:										
Municipal and school section securities, cash value		5,237	1,632	938		67,503			3,928	
Office furniture and fixtures	189	87	500		1,000		400			300
Cash on hand		41	3,288		392	6,443	10,132			215
Cash in banks	23,880	53,677	56,460	31,983	23,251	74,719	40,217	8,982	128,546	30,797
Special deposit in banks			25,000			125,807				
Office premises	3,716		28,000	24,968		19,000			72,000	
Real estate absolutely foreclosed	31,694							5,100		
Real estate otherwise acquired	1,576	5,672	7,929					27,014	738	
Other property	42,513	399	468				1,448	*632,171	10,250	
Total	103,568	65,113	123,277	57,889	25,243	293,474	52,197	673,267	215,462	31,312
Grand total *assets* or *liabilities*	514,597	498,285	1,682,537	1,787,590	2,609,617	5,054,093	1,501 339	1,137,663	3,610,625	406,557
Miscellaneous.										
Dividends declared in year { Rate per cent.	5.	5.	7.	7.	6.	9.	7.		7.	6.
Dividends declared in year { Amount.	10,000	12,500	43,607	50,155	55,941	117,000	44,916		84,000	10,967
Loaned during the year	147,916	90,639	179,060	218,478	847,696	706,605	506,713	3,493	645,023	86,940
Received from borrowers (principal and interest)	120,243	79,882	251,462	319,108	839,168	733,208	391,889	164,750	778,243	98,313
Received from depositors	404,448	426,196	605,871	959,460	1,470,996	1,183,721	981,252		556,335	242,225
Repaid depositors	389,045	382,663	628,178	901,402	1,348,366	1,137,970	815,189	324	563,353	201,059
Debentures issued			161,507	35,300	79,749	581,862	86,460		306,870	
Debentures repaid			111,387	72,800	93,141	566,563	68,900		230,200	600
Debentures to mature within one year			93,657	87,300	154,117	389,370	39,700		89,327	
Average rate of interest { For debentures			4.71	4 83	4.35	4.27	4.82		4.22	5.00
Average rate of interest { For deposits	4.00	4.00	4.18	4.24	4.46	4.00	4.75		4.21	4.28
Interest paid and accrued { On debentures			16,260	8,572	42,769	72,006	9,903		61,288	888
Interest paid and accrued { On deposits	9,500	8,288	22,126	28,400	27,710	48,633	22,438		19,234	6,658
Cost of management	4,040	2,812	10,737	10,574	13,670	30,330	5,559	3,586	24,209	2,238
Invested and secured by mortgage { In Ontario	280,708	406,019	1,541,509	1,665,692	2,498,041	4,760,619	1,357,072	295,480	3,382,230	342,888
Invested and secured by mortgage { Elsewhere	95,184							15,514		
Mortgages by instalments	375,892	155,809	21,426	12,379		745 316	986,258		1,418,090	1,845
Mortgages at stated period		250,240	1,520,083	1,653,313	2,498,041	4,015,273	370,814	310,994	1,964,140	341,043
Average interest on total amount secured by mortgage	6.10	6 25	6.34	6 41	6.49	6.27	6.20		6.29	6 to 9
Average interest on amount loaned on mortgage in year	6.03	6.07	6.22	6.18	6.40	6.16	6.00		6.06	6.13
Mortgages on which compulsory proceedings have been taken { Number			4	3	18	18	16	2	18	1
Mortgages on which compulsory proceedings have been taken { Amount			10,398	8,625	42,975	52,660	34,363	9,728	59,640	3,029
Value of mortgaged property held for sale	43,000	42,300	24,485	29,270	196 885	6,500	24,107	17,703	25,924	21,400
Amount chargeable against such property	42,632	49,172	24,485	27,495	206,359	6,500	21,179	17,703	25,539	21,400

†In liquidation, including $431,425 owing to Dominion Savings. *Including $630,971 estimated loss in realising on assets.

TABLE I. LOAN AND INVESTMENT COMPANIES. -*Continued.*

Schedule.	Orangeville Building, Orangeville.	Ontario Loan, Oshawa.	Home Building and Savings, Ottawa.	Metropolitan Loan, Ottawa.	Ottawa Building, Ottawa.	Owen Sound, Grey and Bruce Loan, Owen Sound.	Central Canada Loan, Peterborough.	Crown Savings, Petrolea.	Midland Loan, Port Hope.	Security Loan, St. Catharines.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	50,000	300,000	1,000,000	320,000	Unlimited	300,000	5,000,000	1,000,000	465,000	300,000
Capital subscribed	24,550	300,000	124,000	320,000	178,600	259,500	2,000,000	182,200	465,000	275,000
Liabilities.										
Liabilities to stockholders:										
Stock fully paid up	15,450					38,200	500,000	115,000	310,000	
Stock on which has been paid	6,234	299,295	6,844	310,560	99,012	60,845	300,000	28,974	31,000	274,256
Accumulating stock				32						
Reserve fund	351	75,000		30,000			200,000	11,500	71,000	
Dividends declared and unpaid				9,318		2,605	24 000	4,281	11,550	8,228
Contingent fund and unappropriated profits	1,096	6,000	135	13,335	278	98	20,000	422	5,849	3,951
Total	23,131	380,295	6,979	363,245	99,290	101,748	1,044,000	160,177	429,399	286,435
Liabilities to the public:										
Deposits		293,517		45,396		24,513	470,565	44,873	248,305	307,832
Debentures payable in Canada		170,300					419,250	18,900	563,828	21,279
Debentures payable elsewhere							1,185,763			
Interest on debentures due and accrued		63					21,214	488	15,168	
Interest on deposits due and accrued						297				
Owing to banks		55,710	640		2,000	3,563				
Other liabilities	53				158	3,356	23,081			
Total	53	519,590	640	45,396	2,158	31,729	2,119,873	64,261	827,301	329,111
Assets.										
Secured loan assets:										
Real estate of—										
General borrowers	22,735	709,646	7,350	281,758	66,900	133,028	2,220,876	198,539	1,102,323	491,008
Directors and executive officers of company		2,642			34,200					
Held under power of sale		75,000					18,374		42,891	62,966
Shareholders' stock		3,011		9,797					10,474	4,876
Directors and officers of company on their stock		8,590		10,420					6 100	
Otherwise secured		13,454	185		330		* 849,777		1,685	11,724
Total	22,735	812,373	7,535	301,975	101,430	133,028	3,089,027	198,539	1,163,473	570,574

Property assets :										
Municipal and school section securities, cash value				528				4,772		
Office furniture and fixtures		500		460		25		14	784	230
Cash on hand		1,156				151	6,514		800	
Cash in banks	449	2,972		6,089	18		58,430	21,113	68,130	44,655
Special deposit in banks		50,000								
Office premises		11,000		16,816			9,748		6,767	
Real estate absolutely foreclosed				82,778					14,157	
Real estate otherwise acquired		21,884								
Other property			84			273	154		2,589	87
Total	449	87,512	84	106,666	18	449	74,846	25,899	93,227	44,972
Grand total *assets* or *liabilities*	23,184	899,885	7,619	408,641	101,448	133,477	3,163,873	224,438	1,256,700	615,546
Miscellaneous.										
Dividends declared in year — Rate per cent	5.	7.		6.		6.	6.	6.	7.	6.
Dividends declared in year — Amount	1,064	20,951		18,635		4,722	48,000	8,384	23,100	16,452
Loaned during the year	4,867	71,147	7,350	39,363	20,200	52,988	500,840	29,753	223,738	115,396
Received from borrowers (principal and interest)	5,983	116,121		62,727	7,137	12,612	536,067	40,290	196,813	125,748
Received from depositors		281,060		56,932		113,581	339,172	55,841	453,984	298,763
Repaid depositors		255,314		57,756		105,640	269,941	64,925	433,048	262,496
Debentures issued		137,700					439,025	30,100	356,363	
Debentures repaid		153,592					313,929	11,300	265,572	8,080
Debentures to mature within one year							242,027	2,000	310,547	7,000
Average rate of interest — For debentures		5.00					4.75	5.00	4.72	5 00
Average rate of interest — For deposits		4.00		4.00		4 to 5	4.80	4.00	4.08	4.00
Interest paid and accrued — On debentures		6,015					66,735	582	15,919	1,297
Interest paid and accrued — On deposits		16,227		1,447		1,398	17,432	1,549	9,513	10,124
Cost of management	113	5,536	335	2,045	518	1,065	21,953	1,184	7,300	4,290
Invested and secured by mortgages — In Ontario	22,735	787,288	7,350	281,758	101,100	133,028	2,239,250	198,539	1,145,214	553,974
Invested and secured by mortgages — Elsewhere										
Mortgages by instalments	3,293	800,000	7,350	7,400	101,100	11,145		198,539	13,345	379,771
Mortgage at stated periods	19,442	487,288		274,358		121,883	2,239,250		1,131,869	174,203
Average interest on total amount secured by mortgage	5.60	6 25	8 00	6.50	6.50	6 to 8	6.26	6.70	6.60	6.60
Average interest on amount loaned on mortgage in year	6.50	6.25	8.00	6.75	6.75	6½ to 7	6.21	6.40	6.20	6.50
Mortgages on which compulsory proceedings have been taken — Number				2			12		14	16
Mortgages on which compulsory proceedings have been taken — Amount				15,436			45,225		28,663	36,663
Value of mortgaged property held for sale		75,000					23,200		37,051	62,966
Amount chargeable against such property		75,000					18,374		42,891	62,966

* On collateral of stocks, bonds and debentures.

TABLE I. LOAN AND INVESTMENT COMPANIES—*Continued.*

Schedule.	*Atlas Loan, St. Thomas.	Elgin Loan, St. Thomas.	Southern Loan, St. Thomas.	Southwestern, Farmers' and Mechanics', St. Thomas.	Star Loan, St. Thomas.	Huron and Lambton Loan, Sarnia.	Industrial Mortgage, Sarnia.	Lambton Loan, Sarnia.	British Mortgage, Stratford.	Stratford Building, Stratford.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	2,000,000	625,000	Unlimited	Unlimited	270,000	1,000,000	500,000	1,000,000	5,000,000	Unlimited
Capital subscribed	550,000	625,000	400,000	141,550	241,500	500,000	160,000	500,000	450,000	122,400
Liabilities.										
Liabilities to Stockholders :										
Stock fully paid up			400,000	135,600	154,400		114,700		139,800	
Stock on which has been paid	184,657	188,792		2,761	28,821	289,950	21,835	496,011	168,397	14,424
Accumulating stock				4		37,269				
Reserve fund	2,500	19,000	63,000	9,700	11,000	54,200	5,004	222,000	62,000	
Dividends declared and unpaid				4,130					10,775	123
Contingent fund and unappropriated profits	672	849	4,306	856	3,115	15		2,325	621	500
Total	187,829	208,641	467,306	153,051	197,336	381,434	141,539	720,336	381,593	15,047
Liabilities to the public :										
Deposits	154,667	126,552	266,406	111,652	142,785	340,508	143,682	435,720	482,882	
Debentures payable in Canada	22,800						19,110	174,700		
Debentures payable elsewhere										
Interest on debentures due and accrued							204	3,313		
Interest on deposits due and accrued									18,519	
Owing to banks							6,008	3,580		400
Other liabilities					314					291
Total	177,467	126,552	266,406	111,652	143,099	340,508	169,004	617,313	501,401	691
Assets.										
Secured loan assets :										
Real estate of—										
General borrowers	360,847	287,375	673,541	215,112	284,732	563,684	283,068	1,207,737	842,945	15,325
Directors and executive officers of company		2,575						5,199	8,377	
Held under power of sale		14,300	14,710		17,500			14,633	15,200	
Shareholders' stock	335	3,957	6,434	1,528	14,870	41,153	1,925	22,448	2,560	
Directors and officers of company on their stock		517	822	2,113	868			4,524		
Otherwise secured						72,167	1,200			
Total	361,182	308,724	695,507	218,753	317,970	677,004	286,193	1,254,541	869,082	15,325

Property assets:											
Municipal and school section securities, cash value			1,212					67,955		
Office furniture and fixtures							850	1,009		
Cash on hand				253		1,200	8,500	6,153		165
Cash in banks	4,114	4,007	12,610	32,252	19,366	43,738			13,912	
Special deposit in banks		20,000	20,383				15,000			
Office premises					3,025			8,000		
Real estate absolutely foreclosed			4,000	5,236						
Real estate otherwise acquired		2,462		8,209						
Other property					74					248
Total	4,114	26,469	38,205	45,950	22,465	44,938	24,350	83,108	13,912	413
Grand total *assets* or *liabilities*	365,296	335,193	733,712	264,703	340,435	721,942	310,513	1,337,649	882,994	15,738
Miscellaneous.										
Dividends declared in year { Rate per cent	6.	6.	7.	6½.	6.	7.	6.	8.	7.	5. and 6.
Dividends declared in year { Amount	10,123	11,190	28,000	8,932	10,770	22,925	7,391	39,448	21,453	530
Loaned during the year	143,468	37,400	93,859	35,337	54,967	80,352	136,411	133,649	186,127	8,225
Received from borrowers (principal and interest)	53,400	70,764	130,525	46,581	59,673	158,690	52,710	211,193	215,986	2,210
Received from depositors	373,130	228,772	300,672	115,433	131,051	355,439	242,476	532,576	609,293	
Repaid depositors	333,649	230,776	285,419	96,167	116,924	340,143	200,454	539,247	569,672	
Debentures issued	17,800						17,410	72,230		
Debentures repaid							1,500	86,969		
Debentures to mature within one year								75,110		
Average rate of interest { For debentures	5 00						5. 00	4.19		
Average rate of interest { For deposits	4 36	4 25	4.00	4.11	4.25	4.57	4. 00	3.88	4.00	
Interest paid and accrued { On debentures	615						547	7,315		
Interest paid and accrued { On deposits	4,104	5,693	10,059	3,771	5,274	14,437	4,265	16,889	18,519	
Cost of management	1,843	2,023	4,322	2,038	1,918	4,008	1,891	4,989	5,509	255
Invested and secured by mortgage { In Ontario	360,847	304,250	688,251	215,112	302,231	563,684	283,068	1,227,569	866,522	15,325
Invested and secured by mortgage { Elsewhere										
Mortgages by instalments	323,042	214,250	342,157	153,797						14,325
Mortgages at stated period	37,805	90,000	346,094	61,315	302,231	563,684	283,068	1,227,569	866,522	1,000
Average interest on total amount secured by mortgage	6.41	6.25	6.40	6.60	6.35	6 25	6.13	6.25	6.22	6.50
Average interest on amount loaned on mortgage in year	6.38	6 25	6.13	6.20	6.20	6.00	6.00	6.25	6.05	6.50
Mortgages on which compulsory proceedings have been taken { Number	4	1	5	1	4		1	6	8	
Mortgages on which compulsory proceedings have been taken { Amount	7,525	3,939	11,117	340	24,000		2,400	14,321	26,884	
Value of mortgaged property held for sale		15,000	14,710		21,000			15,850	15,200	
Amount chargeable against such property		14,300	14,710		17,500			14,633	15,200	

* St. Thomas Loan Co. in 1890.

TABLE I.—LOAN AND INVESTMENT COMPANIES.—*Continued.*

Schedule.	Bristol and West of England, Toronto.	British Canadian, Toronto.	Building and Loan, Toronto.	Canadian Homestead, Toronto.	Canadian Mutual Loan, Toronto.	Canada Landed and National Investment, Toronto.	Canada Permanent, Toronto.	City and County Loan, Toronto.	Dominion Building and Loan, Toronto.	Dovercourt Land, Toronto.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	2,433,333	5,000,000	750,000	1,000,000	50,000,000	4,000,000	5,000,000	500,000	5,000,000	500,000
Capital subscribed	680,117	1,620,000	750,000	581,350	1,296,800	2,008,000	5,000,000	43,450	2,745,700	64,550
Liabilities.										
Liabilities to stockholders:										
Stock fully paid up			750,000				2,000,000	7,200	500	
Stock on which has been paid	136,023	322,629		97,400	16,835	1,004,000	600,000	15,917	105,803	63,650
Accumulating stock					19,208					
Reserve fund	19,467	90,000	112,000			325,000	1,445,000			25,000
Dividends declared and unpaid		11,291	22,500		857	37,798	156,053	1,120		2,227
Contingent fund and unappropriated profits	8,980	9,378	45,221	18,114	1,255	149	117,252	500	3,155	11,102
Total	164,470	433,298	929,721	115,514	38,155	1,366,947	4,318,305	24,737	109,458	101,979
Liabilities to the public:										
Deposits		10,430	178,984	15,484			911,379			
Debentures payable in Canada		184,383	150,075			162,087	417,502			2,000
Debentures payable elsewhere	1,087,021	1,321,640	536,795			2,634,280	$6,251,715			
Interest on debentures due and accrued	11,727	15,960				19,464	40,713			12
Interest on deposits due and accrued							141,222			
Owing to banks										
Other liabilities	8,434	2,820	855			32,269	10,937	315		17,082
Total	1,107,182	1,535,233	866,709	15,484		2,848,100	7,773,468	315		19,094
Assets.										
Secured loan assets:										
Real estate of—										
General borrowers	1,216,988	1,771,921	1,448,921	123,125	33,386	3,723,499	10,938,671	23,061	92,673	69,756
Directors and executive officers of company								800		
Held under power of sale	38,404	118,785				256,714	389,753			
Shareholders' stock		1,300	7,812		300		22,904			
Directors and officers of company on their stock										
Otherwise secured				205		20,143	25,000		1,559	256
Total	1,255,392	1,892,006	1,456,733	123,330	33,686	4,000,356	11,376,328	23,861	94,232	70,012

operty assets :											
Municipal and school section securities, cash value	.....	1,945	.....	.....	.....	.....	197,484	.....	.....	.....	
Office furniture and fixtures	.....	446	.....	125	.....	.....	.....	64	.....	.....	
Cash on hand	23	2,891	759	.....	318	784	851	562	56	1,072	
Cash in banks	16,237	56,184	38,558	7,543	4,002	124,120	302,150	565	143	5,045	
Special deposit in banks	.....	.....	15,000	.....	.....	.....	90,000	.....	‡15,027	.....	
Office premises	.....	.....	80,000	.....	.....	40,000	123,445	.....	.....	.....	
Real estate absolutely foreclosed	.....	.....	*204,106	.....	.....	49,787	.....	.....	.....	.....	
Real estate otherwise acquired	.....	.....	.....	.....	.....	.....	.....	.....	.....	30,040	
Other property	.....	15,059	1,274	.....	149	.....	1,515	.....	.....	14,904	
Total	16,260	76,525	339,697	7,668	4,469	214,691	715,445	1,191	15,226	51,061	
Grand total *assets* or *liabilities*	1,271,652	1,968,531	1,796,430	130,998	38,155	4,215,047	12,091,773	25,052	109,458	121,073	
Miscellaneous.											
Dividends declared in year — Rate per cent	8.	7.	6.	.....	††	7.	12	6	.....	7.	
Dividends declared in year — Amount	10,882	22,583	45,000	.....	2,026	70,280	312,000	1,120	.....	4,456	
Loaned during the year	114,406	305,551	153,826	44,600	33,686	681,800	1,612,056	17,214	92,673	.....	
Received from borrowers (principal and interest)	176,796	320,826	290,860	6,269	1,545	723,500	2,421,970	5,798	.....	.....	
Received from depositors	.....	.....	430,294	†54,596	.....	.....	250,049	.....	.....	.....	
Repaid depositors	.....	.....	494,015	†30,807	.....	.....	320,546	.....	.....	.....	
Debentures issued	73,000	170,964	136,157	.....	.....	545,000	775,924	.....	.....	.....	
Debentures repaid	69,277	37,820	104,878	.....	.....	387,000	486,845	.....	.....	1,500	
Debentures to mature within one year	211,043	181,244	143,285	.....	.....	561,000	1,529,508	.....	.....	1,500	
Average rate of interest — For debentures	4.26	4.46	4.53	.....	.....	4.43	4 09	.....	.....	5.00	
Average rate of interest — For deposits	.....	4.43	3.40	5.00	.....	.....	3.91	.....	.....	.....	
Interest paid and accrued — On debentures	46,559	68,374	30,724	.....	.....	117,400	322,375	.....	.....	149	
Interest paid and accrued — On deposits	.....	.....	7,223	1,840	.....	.....	62,241	.....	.....	.....	
Cost of management	19,423	13,533	13,703	2,054	.....	28,221	90,917	536	.....	1,868	
Invested and secured by mortgage — In Ontario	1,255,392	1,890,706	1,328,818	123,125	33,386	3,111,500	9,821,524	23,861	92,673	69,756	
Invested and secured by mortgage — Elsewhere	.....	.....	120,103	.....	.....	868,713	1,506,900	.....	.....	.....	
Mortgages by instalments	12,695	714,846	58,481	.....	.....	182,574	10,042,356	4,707	92,673	69,756	
Mortgages at stated period	1,242,697	1,175,860	1,390,440	123,125	33,386	3,797,639	1,286,068	19,154	.....	.....	
Average interest on total amount secured by mortgage	6.70	6.36	6.69	6.00	10.80	6.77	6 70	7.00	6.00	.....	
Average interest on amount loaned on mortgage in year	6.53	6.65	6.75	6.00	10.80	6.50	‖ 7.13	7.00	6.00	.....	
Mortgages on which compulsory proceedings have been taken — Number.	6	13	11	.....	.....	43	182	.....	.....	.....	
Mortgages on which compulsory proceedings have been taken — Amount.	16,273	27,025	30,322	.....	.....	55,790	439,801	.....	.....	.....	
Value of mortgaged property held for sale	38,404	120,000	.....	.....	.....	256,714	440,425	.....	.....	.....	
Amount chargeable against such property	38,404	118,785	.....	.....	.....	256,714	389,753	.....	.....	.....	

* Acquired by foreclosure or otherwise. † Members only for dues. § including $849,316 of debenture stock at 4 per cent. ‡ In Trusts to Corporation of Ontario. ‖ 6.70 per cent. in Ontario, 8 per cent. elsewhere. †† 14 per cent. on prepaid stock and 25½ per cent. on instalment stock.

TABLE I. LOAN AND INVESTMENT COMPANIES.—*Continued.*

Schedule.	Farmers' Loan, Toronto.	Freehold Loan, Toronto.	Home Savings, Toronto.	Imperial Loan, Toronto.	Land Security, Toronto.	London and Canadian, Toronto.	London and Ontario, Toronto.	North British Canadian, Toronto.	North of Scotland, Toronto.	Ontario Industrial, Toronto.	People's Loan, Toronto.
Capital Stock.	$	$	$	$	$	$	$	$	$	$	$
Capital authorised	1,057,250	3,800,000	2,000,000	1,000,000	5,000,000	5,000,000	2,500,000	2,433,333	3,650,000	500,000	600,000
Capital subscribed	1,057,250	3,223,500	1,750,000	629,850	1,382,300	5,000,000	2,500,000	2,433,333	3,650,000	466,800	600,000
Liabilities.											
Liabilities to stockholders:											
Stock fully paid up	500,000	843,000	.....	.....	.....	.....	.....	.....	.....	58,000	600,000
Stock on which has been paid	111,430	476,100	175,000	626,350	548,498	700,000	500,000	486,667	730,000	256,317	.....
Accumulating stock	.....	.....	.....	1,139	.....	.....	.....	.....	.....	.....	.....
Reserve fund	137,249	648,918	135,000	135,000	550,000	375,000	140,000	87,600	311,467	190,000	112,000
Dividends declared and unpaid	21,400	52,764	6,125	21,962	27,415	28,000	17,500	17,542	36,500	11,001	21,000
Contingent fund and unappropriated profits	.....	58,533	16,542	5,459	41,901	16,522	.....	§38,666	6,516	10,132	9,928
Total	770,079	2,079,315	332,667	789,910	1,167,814	1,119,522	657,500	630,475	1,084,483	525,450	742,928
Liabilities to the public:											
Deposits	445,166	744,846	1,699,279	47,210	194,563	.....	.....	25,030	.....	71,398	426,469
Debentures payable in Canada	249,789	638,613	.....	203,900	471,535	36,500	465,873	.....	.....	.....	163,100
Debentures payable elsewhere	455,374	2,596,146	.....	961,061	176,514	†3,416,466	1,824,384	‖1,810,787	††2,800,411	.....	21,900
Interest on debentures due and accrued	15,994	66,371	.....	25,856	4,006	23,858	18,461	11,944	.....	.....	2,604
Interest on deposits due and accrued	.....	15,115	58,421	3,126	3,614	.....	.....	.....	.....	1,705	.....
Owing to banks	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other liabilities	.....	.....	2,500	1,000	133,925	15,203	3,280	6,569	5,169	183,889	344
Total	1,166,323	4,061,091	1,760,200	1,242,153	984,157	3,492,027	2,311,998	1,854,330	2,805,580	256,992	614,417
Assets.											
Secured loan assets:											
Real estate of—											
General borrowers	1,810,612	5,293,703	958,133	1,964,188	946,708	3,597,701	2,676,951	2,193,244	3,625,462	229,113	1,219,526
Directors and executive officers of company	.....	.....	23,799	.....	.....	.....	.....	.....	.....	.....	.....
Held under power of sale	55,570	312,751	1,123	3,000	23,443	247,524	104,402	120,347	.....	.....	63,653
Shareholders' stock	7,736	35,662	4,732	5,224	.....	.....	.....	.....	.....	5,467	6,927
Directors and officers of company on their stock	.....	.....	3,932	.....	.....	.....	.....	.....	.....	.....	.....
Otherwise secured	.....	.....	*970,222	.....	39,653	160,765	.....	.....	50	238	155
Total	1,873,918	5,642,116	1,961,941	1,972,412	1,009,804	4,005,990	2,781,353	2,313,591	3,625,512	234,818	1,290,261

Property assets :												
Municipal and school section securities, cash value	.....	2,028	44,523	....	.....	315,585	56,854	10,371	165,304	....	.....	
Office furniture and fixtures	296	1,715	1,800	.....	.. ..	.....	2,179	243	1,587	.....	450	
Cash on hand	2,508	1,769	4,825	1,422	.. ..	.....	270	778	121	6	1,500	
Cash in banks	57,679	124,612	63,928	58,229	52,953	50,356	127,903	14,765	10,741	10,798	65,134	
Special deposits in banks	... .	143,335	.. ..	....	.....	.....	.. ..	43,800	....	.....	.. ...	
Office premises	....	126,068	15,850	.....	.. ..	120,000	.....	.....	68,057	.....	.....	
Real estate absolutely foreclosed	.....	65,812	.....	.. ..	.....	.....	.....	**60,019	18,741	. .....	.....	
Real estate otherwise acquired	.....	30,911	.....	.. ..	1,089,214	116,767	. .....	.....	.....	536,820	.....	
Other property	2,001	2,040	....	.....	.....	2,851	939	41,238	... .	.....	.....	
Total	62,484	498,290	130,926	59,651	1,142,167	605,559	188,145	171,214	264,551	547,624	67,084	
Grand total *assets* or *liabilities*	1,936,402	6,140,406	2,092,867	2,032,063	2,151,971	4,611,549	2,969,498	2,481,805	3,890,063	782,442	1,357,345	
Miscellaneous.												
Dividends declared in year { Rate per cent	7.	8.	7.	7.	10.	8.	7.	6.	10.	7.	7.	
Dividends declared in year { Amount	42,800	105,528	11,715	43,921	54,723	56,000	35,000	29,200	73,000	22,001	41,989	
Loaned during the year	309,709	866,559	1,935,977	526,198	238,183	495,126	186,537	396,672	476,000	36,142	145,446	
Received from borrowers (principal and interest)	137,288	1,252,096	1,937,922	413,536	313,745	857,550	414,852	440,003	373,000	50,580	270,501	
Received from depositors	402,082	478,589	4,422,858	151,573	166,526	....	.....	51,805	.....	28,140	593,635	
Repaid depositors	450,330	550,548	4,387,675	166,913	153,569	....	.....	52,229	.....	27,828	605,483	
Debentures issued	92,662	561,216	....	184,130	614,814	933,426	350,135	222,263	††721,610	.....	36,033	
Debentures repaid	17,540	500,516	. ...	59,869	470,000	879,405	306,286	124,132	††605,196	.....	13,900	
Debentures to mature within one year	41,207	719,020	.....	286,863	272,100	308,045	35,891	443,325	††611,391	....	51,300	
Average rate of interest { For debentures	4.75	4.52	.....	4.60	4.83	4.17	4.53	4.48	4.00	.....	5.14	
Average rate of interest { For deposits	4.25	3.98	4.00	4.25	4.61	.....	.....	4.75	.....	5.00	4.52	
Interest paid and accrued { On debentures	30,830	142,769	.....	53,138	29,786	143,256	99,585	85,206	108,252	.....	8,849	
Interest paid and accrued { On deposits	22,288	31,369	62,640	3,126	11,923	.....	.....	1,189	.....	3,396	18,808	
Cost of management	11,274	46,112	16,827	18,031	18,354	43,616	31,512	18,868	45,212	4,941	8,515	
Invested and secured by mortgage. { In Ontario	1,850,441	4,632,756	983,055	1,508,036	1,031,649	} 3,845,225	2,781,353	2,313,591	3,625,462	{ 229,113	1,283,179	
Invested and secured by mortgage. { Elsewhere	15,741	973,698	.....	459,152	.....					{	.....	
Mortgages by instalments	... ...	925,300	217,098	495,915	291,902	....	... ...	1,922	... .	.....	17,646	
Mortgages at stated period	1,866,182	4,681,154	735,957	1,471,273	739,747	3,845,225	2,781,353	2,311,669	3,625,462	229,113	1,265,533	
Average int. on total amount secured by mortgage	6.50	6.64	6.00	6 75 ‡	....	6.39	6.69	6.75	6.87	6.25	6.29	
Average interest on amount loaned in year	6.50	6.65	6.05	6.50	6 75	6.59	6.56	6 75	6.75	6.25	6.99	
Mortgages on which compulsory proceedings have been taken { Number	14	66	2	13	5	55	10	12	23	1	13	
Mortgages on which compulsory proceedings have been taken { Amount	18,965	193,161	6,000	50,377	5,935	90,377	28,895	22,439	51,850	1,450	59,593	
Value of mortgaged property held for sale	70,000	304,751	1,500	3,000	24,615	247,524	104,640	120,347	....	....	70,500	
Amount chargeable against such property	55,570	312,751	1,123	3,000	23,443	247,524	104,402	120,317	.....	....	63,65	

* On the collateral security of bonds, stocks and debentures. ‡ Six per cent. on land sales, eight per cent. on loans. | Including $368,728 of debenture stock.
§ Including $12,288 in anticipation of calls. † Including certificates payable at fixed dates. ** And otherwise acquired. †† Including deposit receipts.

TABLE I. LOAN AND INVESTMENT COMPANIES.—*Continued.*

Schedule.	Real Estate Loan, Toronto.	Scottish Ontario and Manitoba, Toronto.	Sons of England Building, Toronto.	Toronto General Trusts, Toronto.	Toronto Land and Loan, Toronto.	Toronto Savings and Loan, Toronto.	Trust and Loan, Toronto.	Union Loan, Toronto.	Western Canada Loan, Toronto.	Oxford Permanent Loan, Woodstock.
Capital Stock.	$	$	$	$	$	$	$	$	$	$
Capital authorised	2,000,000	2,433,333	1,000,000	1,000,000	1,000,000	2,000,000	14,600,000	1,000,000	3,000,000	Unlimited
Capital subscribed	732,600	1,216,667	40,000	1,000,000	104,600	400,000	7,300,000	1,000,000	3,000,000	242,450
Liabilities.										
Liabilities to stockholders:										
Stock fully paid up	401,050		2,000			400,000		599,680	1,000,000	230,550
Stock on which has been paid	66,833	608,333	4,397	128,611	76,369		1,581,667	79,880	500,000	2,554
Accumulating stock										
Reserve fund		38,933		206,000	1,015	50,000	792,664	245,000	770,000	20,000
Dividends declared and unpaid		122		6,131		12,000		26,963	75,000	7,812
Contingent fund and unappropriated profits	1,339	*242,470	443	17,675	10,043	3,823	91,357	17,620	100,652	6,615
Total	469,222	889,858	6,840	358,717	87,427	465,323	2,465,688	969,143	2,445,652	267,531
Liabilities to the public:										
Deposits	280	11,972			3,043	28,976		408,160	1,110,198	98,487
Debentures payable in Canada						329,560		134,967	423,250	
Debentures payable elsewhere		329,674					4,750,155	966,019	2,885,737	
Interest on debentures due and accrued		2,280				9,062			36,440	
Interest on deposits due and accrued		75				285			22,000	
Owing to banks				16,579	3,000					
Other liabilities		11,974		†3,456,662	59,951	186,314	154,180		29,837	397
Total	280	355,975		3,473,241	65,994	554,137	4,904,335	1,509,146	4,507,462	98,884
Assets.										
Secured loan assets:										
Real estate of—										
General borrowers	88,248	170,013	6,400	3,469,993	90,433	53,550	5,908,025	2,184,656	6,399,998	316,560
Directors and executive officers of company										
Held under power of sale	134,000	62,218					68,424	105,660	275,785	9,254
Shareholders' stock	1,281		150					12,355	12,501	12,375
Directors of officers of company on their stock										
Otherwise secured		14,564		11,059			4,570	1,000	566	
Total	223,529	246,795	6,550	3,481,052	90,433	53,550	5,981,019	2,303,671	6,688,850	338,189

Property assets :											
Municipal and school section securities, cash value											
Office furniture and fixtures	150	180		737			968	1,239	2,454	276	
Cash on hand	128	446		1		11,827	1,971	143	459	255	
Cash in banks	11,635	28,414	290	182,321	795	1,082	45,084	41,334	136,758	18,683	
Special deposit in banks	19,215						417,267	70,000			
Office premises				130,000			83,110	61,223	113,478	7,762	
Real estate absolutely foreclosed	128,919						83,056				
Real estate otherwise acquired	16,449	954,810			61,883	536,426					
Other property	69,477	15,188		37,844	310	†† 416,575	§ 757,548	679	11,115	1,250	
Total	245,973	999,038	290	350,906	62,988	965,910	1,389,004	174,618	264,264	28,226	
Grand total *assets* or *liabilities*	469,502	1,245,833	6,840	3,831,958	153,421	1,019,460	7,370,023	2,478,289	6,953,114	366,415	
Miscellaneous.											
Dividends declared in year { Rate per cent.				10.	6.	6.	6½	8.	10.	6½	
Dividends declared in year { Amount				12,861	4,558	24,000	102,808	53,811	152,513	15,140	
Loaned during the year	75,800		2,950	717,413	3,022	110,691	809,438	449,661	900,052	19,874	
Received from borrowers (principal and interest)	42,963		370	616,436	14,872	113,144	816,638	376,421	1,198,423	52,113	
Received from depositors		4,031			3,451	63,909		447,009	387,281	80,157	
Repaid depositors		4,226			1,462	34,648		467,970	366,056	78,282	
Debentures issued		25,161				27,000	549,301	284,476	343,843		
Debentures repaid		17,693					109,417	57,600	325,600		
Debentures to mature within one year		50,711				46,200	544,431	90,457	400,595		
Average rate of interest { For debentures		5.00				5.00	4.04	4.50	4.13		
Average rate of interest { For deposits		4.50			5.00	4.25		4.00	3.95	4.50	
Interest paid and accrued { On debentures		16,961				15,332	217,520	43,045	136,631		
Interest paid and accrued { On deposits		666			129	314		15,537	44,711	3,821	
Cost of management	4,565	5,106	83	30,621	1,778	8,582	66,763	16,284	53,931	1,892	
Invested and secured by mortgage { In Ontario	61,544	97,260	6,400	‡3,526,157	90,433	53,550	2,693,073	2,290,316	4,829,475	325,814	
Invested and secured by mortgage { Elsewhere	160,704	134,971					3,283,376		1,846,308		
Mortgages by instalments								790,316	6,675,783	8,061	
Mortgages at stated period	222,248	232,231	6,400	3,526,157	90,433	53,550	5,976,449	1,500,000		317,750	
Average interest on total amount secured by mortgage	6.50	6.50	6.50	6.50	7.00	6.45	6 63	6.75	7.00	6.75	
Average interest on amount loaned on mortgage in year	6.50	6 00	6.60	6.00	6.00	6.50	7.11	6.75	7.00	6.25	
Mortgages on which compulsory proceedings have been taken { Number		1		4	8		69	15	45	4	
Mortgages on which compulsory proceedings have been taken { Amount		10,000		23,000	15,617		110,597	35,800	115,366	4,277	
Value of mortgaged property held for sale	145,367	74,723		63,100			61,046	105,660	300,000	9,500	
Amount chargeable against such property	134,000	62,218		70,662			68,424	105,660	275,785	9,251	

* Including $242,113 paid in anticipation of calls. † Including for High Court of Justice $1,855,143 and for Trusts and Agencies $1,591,400. ‡ Including for Lunatic estates $56,464. †† Including $407,453, Loan, Insurance and Trust Company Stocks. § Including $346,263 Dominion securities and $377,532 Consols and bonds.

LOAN AND INVESTMENT COMPANIES.

TABLE II. Summary statement showing totals of all companies reporting for the five years 1887-91

Schedule.	1891.	1890.	1889.	1888.	1887.
Number of companies reported	71	67	71	64	55
Capital Stock.	$	$	$	$	$
Capital authorised	164,837,249	102,782,249	99,824,249	96,246,249	79,575,583
Capital subscribed	76,152,817	70,672,710	69,694,221	67,939,559	56,114,310
Liabilities.					
Liabilities to stockholders :					
Stock fully paid up	13,727,930	12,498,330	12,149,509	11,617,271	11,342,861
Stock on which has been paid	18,608,795	18,688,567	18,569,883	18,470,826	15,429,167
Accumulating stock	100,688	99,836	107,935	205,839	222,602
Reserve fund	9,866,475	9,288,795	8,711,107	8,030,118	7,254,105
Dividends declared and unpaid	940,995	952,907	985,602	955,644	885,736
Contingent fund and unappropriated profits	1,134,514	1,145,117	1,105,951	828,463	776,092
Total	44,379,397	42,673,552	41,629,987	40,108,161	35,910,563
Liabilities to the public :					
Deposits	18,176,765	17,103,403	16,942,965	16,560,766	17,533,413
Debentures payable in Canada	7,910,676	7,654,504	7,622,256	6,578,122	5,500,622
Debentures payable elsewhere	41,023,249	38,435,990	36,712,825	34,857,050	26,722,070
Interest on debentures due and accrued	433,954	397,599	683,322	619,070	587,484
Interest on deposits due and accrued	283,310	296,847			
Owing to banks	91,480	269,094	214,046	131,903	155,326
Other liabilities	4,837,715	1,386,762	791,742	793,264	678,189
Total	72,757,149	65,544,199	62,967,156	59,540,175	51,177,104
Assets.					
Secured loan assets :					
Real estate of—					
General borrowers	97,780,207	92,001,824	91,536,309	85,578,993	74,954,076
Held under power of sale	3,381,150	3,006,109			
Directors and executive officers of company	94,158	182,724	207,965	169,777	252,957

Shareholders' stock	521,659	609,797	602,587	708,137	852,267
Directors and officers of company on their stock	158,507	147,110	149,375	126,482	177,465
Otherwise secured	2,429,344	2,163,468	2,170,651	2,458,801	2,799,039
Total	104,365,025	98,111,032	94,666,887	89,042,190	79,035,804
Property assets :					
Municipal and school section securities, cash value	1,072,558	892,101	936,271	1,159,113	1,153,165
Office furniture and fixtures	24,690	24,424	27,182	30,385	27,372
Cash on hand	109,684	101,785	101,376	63,768	74,053
Cash in banks	2,637,761	2,002,822	2,501,983	2,316,875	2,127,308
Special deposit in banks	1,344,903	640,697			
Office premises	1,270,095	1,028,296	1,001,508	869,650	751,971
Real estate absolutely foreclosed	760,200	900,612	1,095,197	6,166,355	3,917,994
Real estate otherwise acquired	3,465,404	2,589,190	2,283,817		
Other property	2,086,226	1,926,792	1,982,922		
Total	12,771,521	10,106,719	9,930,256	10,606,146	8,051,863
Grand total *assets* or *liabilities*	117,136,546	108,217,751	104,597,143	99,648,336	87,087,667
Miscellaneous.					
Dividends declared in year — Rate per cent.	7.12	7.21	7.06	7.28	7.55
Dividends declared in year — Amount	2,309,701	2,250,027	2,202,217	2,152,377	2,021,207
Loaned during the year	19,124,870	18,542,000	21,795,945	18,567,954	17,162,412
Received from borrowers (principal and interest)	22,096,610	20,469,955	21,353,871	20,393,404	18,987,927
Received from depositors	23,968,569	23,347,971	24,734,347	23,001,584	25,283,071
Repaid depositors	23,224,399	23,416,074	24,583,550	24,261,630	25,283,441
Debentures issued	9,400,632	10,564,009	11,337,938	8,736,777	6,263,884
Debentures repaid	6,783,889	8,523,124	7,578,661	5,944,268	4,346,294
Debentures to mature within one year	8,236,001	7,856,937	10,230,949	10,527,983	5,777,979
Interest paid and accrued — On debentures	2,147,903	2,035,921	2,015,084	1,906,741	1,552,621
Interest paid and accrued — On deposits	743,903	710,285	680,570	710,636	685,138
Cost of management	877,141	846,950	843,390	838,906	685,905
Invested and secured by mortgage	101,373,476	95,245,657	91,574,215	86,728,523	75,494,963
Mortgages by instalments	29,388,316	28,285,503	29,233,503	32,337,689	30,001,162
Mortgages at stated period	71,985,160	66,960,154	62,340,712	54,390,834	45,493,801
Mortgages on which compulsory proceedings have been taken — Number	892	805	767	820	688
Mortgages on which compulsory proceedings have been taken — Amount	2,081,354	1,899,209	1,850,647	1,834,890	1,419,012
Value of mortgaged property held for sale	3,564,646	3,199,209	3,026,619	3,196,160	2,491,788
Amount chargeable against such property	3,451,812	3,006,109	2,860,394	2,969,480	2,190,465

LOAN AND INVESTMENT COMPANIES.

TABLE III. Showing comparative statistics of 54 companies reporting for the five years 1887-91.

Schedule.	1891.	1890.	1889.	1888.	1887.
	$	$	$	$	$
Capital subscribed	60,381,017	61,280,660	60,331,132	57,335,159	56,048,310
Liabilities.					
Liabilities to stockholders:					
Stock paid in and accumulating stock.	28,939,751	28,871,418	28,468,476	27,511,217	26,932,431
Reserve fund	9,230,931	8,927,162	8,369,624	7,666,384	7,241,765
Dividends declared and unpaid	867,292	893,632	929,638	899,906	885,736
Contingent fund and unappropriated profits	796,109	832,667	801,055	773,730	774,500
Total	39,834,083	39,524,879	38,568,793	36,851,237	35,834,432
Liabilities to the public:					
Deposits	17,658,123	16,893,287	16,823,175	16,519,063	17,533,413
Debentures payable in Canada	6,873,944	7,047,214	7,089,355	5,949,676	5,500,622
Debentures payable elsewhere	35,736,764	33,291,108	31,601,564	29,078,893	26,722,070
Interest on deposits and debentures due and accrued	656,673	648,231	638,689	570,858	587,484
Owing to banks	62,290	217,175	171,320	114,852	155,326
Other liabilities	1,165,976	1,355,309	749,789	714,753	678,189
Total	62,153,770	59,452,324	57,073,892	52,948,095	51,177,104
Assets.					
Secured loan assets:					
Real estate of—					
General borrowers	88,909,392	87,164,087	84,046,586	77,786,343	74,907,069
Directors and executive officers of company	59,158	158,724	188,565	164,977	252,957
Shareholders, directors and officers of company on their stock	668,951	755,307	748,632	829,150	1,028,519
Otherwise secured	2,399,999	2,141,204	2,125,691	2,413,756	2,799,039
Total	92,037,500	90,219,322	87,109,474	81,194,226	78,987,584
Property assets:					
Municipal and school section securities, cash value	1,003,388	820,251	857,174	1,078,462	1,061,151
Office premises, furniture and fixtures.	1,159,643	1,049,333	1,025,157	896,501	779,343
Cash on hand and in banks	3,554,344	2,585,755	2,399,847	2,102,288	2,189,670
Real estate absolutely foreclosed or otherwise acquired	2,674,349	2,493,194	2,468,151	2,528,241	2,203,676
Other property	1,558,629	1,809,348	1,782,882	1,999,614	1,790,112
Total	9,950,353	8,757,881	8,533,211	8,605,106	8,023,952
Grand total *assets* or *liabilities*.	101,987,853	98,977,203	95,642,685	89,799,332	87,011,536
Miscellaneous.					
Dividends declared in year	2,144,548	2,138,647	2,097,321	2,032,336	2,017,476
Loaned during the year	16,797,699	17,263,028	20,391,348	17,048,536	17,160,053
Received from borrowers (principal and interest)	19,943,157	19,114,906	19,941,262	18,820,162	18,987,927
Received from depositors	22,977,548	22,856,709	24,419,674	22,918,698	25,283,071
Repaid depositors	22,372,205	23,028,209	24,357,831	24,188,350	25,283,441
Debentures issued	8,554,899	9,908,610	10,505,870	7,958,544	6,263,884
Debentures repaid	6,266,158	7,974,017	6,868,817	5,123,871	4,346,294
Debentures to mature within one year.	7,463,630	6,966,372	9,080,986	9,033,705	5,777,979
Interest paid and { On debentures	1,860,951	1,764,534	1,741,483	1,592,484	1,552,621
accrued { On deposits	725,271	702,140	676,871	708,708	685,138
Cost of management	757,619	767,158	765,390	748,327	684,966
Mortgages on which compulsory { No.	845	738	716	735	688
proceedings have been taken { Amt.	1,956,779	1,779,796	1,746,794	1,670,733	1,419,012
Value of mortgaged property held for sale	3,059,736	2,799,362	2,611,812	2,719,277	2,475,568
Amou't chargeable against such property	2,959,009	2,606,651	2,446,634	2,493,399	2,174,245

LOAN AND INVESTMENT COMPANIES.

TABLE IV. Comparative statement showing the amount loaned in each year, with a yearly average for the five years 1887-91, by the 54 companies that have reported for the full period.

Companies.	1891.	1890.	1889.	1888.	1887	Average 1887-91.
	$	$	$	$	$	$
Toronto:						
Bristol and West of England	114,406	238,143	234,073	229,431	258,202	214,851
Building and Loan	153,826	285,400	331,079	289,973	263,431	264,742
Canada Landed Credit / National Investment Association	681,890	211,297 / 218,440	252,550 / 316,076	237,547 / 299,236	294,325 / 274,303	557,115
Canada Permanent Loan	1,612,056	2,115,055	2,276,984	2,122,103	1,416,069	1,908,453
*Dovercourt Land and Building						
Farmers' Loan	309,709	440,425	391,567	308,119	368,263	363,617
Freehold Loan	866,559	1,122,186	1,459,559	823,144	1,289,036	1,112,097
Home Savings	1,935,977	1,464,239	1,586,866	1,387,119	1,222,707	1,519,394
Imperial Loan	526,498	351,599	453,068	469,764	661,421	492,470
Land Security	238,483	290,735	619,854	476,965	354,049	396,017
London and Canadian Loan	495,126	627,732	608,605	605,581	774,782	622,365
North of Scotland Mortgage	476,000	456,892	841,811	486,653	481,203	548,512
Ontario Industrial Loan	36,142	59,575	174,431	108,974	75,948	91,014
People's Loan	145,446	161,824	297,205	242,067	248,628	219,034
Real Estate Loan	75,800	170,748	72,894	20,501	7,484	69,486
Toronto Land and Loan	3,022	15,259	64,695	9,528	42,107	26,922
Trust and Loan	809,438	1,080,875	776,601	917,430	641,985	845,266
Union Loan	449,661	530,242	672,855	435,998	429,371	503,625
Western Canada Loan	900,052	1,105,056	1,224,811	1,303,682	1,105,339	1,127,788
London:						
Agricultural Savings	179,060	133,798	301,479	216,853	303,557	226,949
Canadian Savings	248,478	185,487	242,036	190,843	300,418	233,452
Dominion Savings / Empire Loan	847,696	990,823 / 68,369	276,468 / 69,694	391,896 / 53,844	458,215 / 81,092	647,620
Huron and Erie Loan	706,605	737,013	937,176	736,594	540,713	731,629
London Loan	506,713	200,470	290,526	200,805	218,814	283,466
†Ontario Investment Association	3,493	5,002	6,099	42,496	412,346	93,887
Ontario Loan	645,023	458,585	588,325	619,880	618,381	586,039
Royal Standard Loan	86,940	44,472	52,106	23,670	71,466	55,731
St. Thomas:						
Elgin Loan	37,400	30,124	123,682	19,701	68,283	55,838
Southern Loan	93,859	42,942	101,977	83,532	94,062	83,274
Southwestern Farmers' Loan	35,337	15,957	56,219	36,767	48,638	38,584
Star Loan	54,967	65,314	46,299	44,924	65,543	55,409
Hamilton:						
Hamilton Provident and Loan	747,150	621,370	624,245	751,309	816,136	712,042
Hamilton Homestead Loan	17,364	14,814	10,718	17,032	23,584	16,702
Landed Banking and Loan	385,308	258,147	371,083	341,688	324,486	336,142
Kingston:						
Frontenac Loan	147,916	52,039	70,080	70,772	56,076	79,377
Ontario Building	90,639	31,703	64,173	135,367	138,130	92,002
Sarnia:						
Huron and Lambton Loan	80,352	142,677	156,072	94,386	131,657	121,029
Lambton Loan	133,649	203,750	213,918	212,760	265,744	205,964
Other places:						
Hastings Loan.....Belleville.	96,396	72,004	26,140	49,571	71,312	61,285
Royal Loan.....Brantford.	155,242	154,666	203,467	214,873	200,638	185,777
Chatham Loan.....Chatham.	90,957	48,743	94,627	47,544	74,257	71,226
Huron and Bruce.....Goderich.	29,143	46,415	29,854	34,024	57,054	39,298
Guelph and Ontario...Guelph.	356,906	248,962	287,584	316,010	337,054	309,303
Orangeville Building..Orangeville.	4,867	2,388	93	6,477	705	2,906
Ontario Loan.....Oshawa.	71,147	98,561	102,045	88,895	114,518	95,033
Metropolitan Loan....Ottawa.	39,363	50,408	47,061	57,777	34,364	45,795
Central Canada.....Peterborough.	500,840	741,276	1,684,371	713,401	317,401	791,458
Crown Savings.....Petrolea.	29,753	47,565	51,606	24,231	18,005	34,232
Midland Loan.....Port Hope.	223,738	180,519	202,514	153,441	171,591	186,361
Security Loan.....St. Catharines	115,396	135,937	134,761	149,603	199,876	145,315
British Mortgage.....Stratford.	186,127	157,449	223,988	127,811	253,495	189,774
Oxford Permanent.....Woodstock.	19,874	29,497	45,278	14,938	72,789	36,475
Total for 54 companies	16,797,699	17,263,028	20,391,348	17,048,536	17,160,053	17,732,133

* No loans stated in returns, but mortgages are given for balances due in land purchased. † In liquidation.

PART V.

CHATTEL MORTGAGES.

The second annual returns of chattel mortgages required to be made by Clerks of the County Courts to the Minister of Agriculture have been received. The compilation of these has as usual been entrusted to this Bureau. After considerable correspondence and rather dilatory replies to our endeavors to eliminate apparent discrepancies in several returns, the reports are all complete They have been summarised in two ways, (1) by county court divisions, and (2) by occupations or callings of the mortgagors. Great difficulty seems to be experienced in classifying the instruments by occupations, each Clerk placing his own construction upon it. The general term, for instance, as manufacturer is used by many instead of the specific industry such as is adopted by the majority Not having access to the instruments themselves, we have therefore of necessity followed the classification given in the return as far as amended by correspondence.

In all cases instructions were given that "the returns shall not include instruments which have lapsed by reason of non-renewal."

Table I classifies the aggregate of instruments by counties, while the following summary shows the number and amount of chattel mortgages on record and undischarged in the province on December 31, of the years 1889, 1890 and 1891:

Chattel mortgages on record and undischarged.	1891.		1890.		1889.	
	No.	Amount.	No.	Amount.	No.	Amount.
		$		$		$
To secure existing debt or present advance	18,902	8,595,417	17,271	8,121,316	15,629	6,973,837
To secure future indorsation or advance	516	998,971	632	857,542	585	518,071
Total	19,418	9,501,388	17,903	8,978,858	16,214	7,491,908

It will be seen that the number of chattel mortgages has increased in 1891 by 1,515 as compared with an increase of 1,689 in 1890, while the amount increased in 1891 by $525,530 against $1,486,950 in 1890. The increase in 1890 was due chiefly to the large advances required by lumbermen in that year, while in Table II it will be found that the liability of this class on their chattels in 1891 was greatly diminished. The average chattel mortgage on record at the end of 1891 was $489 as compared with $502 in 1890 and $462 in 1889.

In the following table the compilation is by county groups:

Districts.	1891		1890.		1889.	
	No.	Amount.	No.	Amount.	No.	Amount.
		$		$		$
Lake Erie	2,790	980,671	2,625	936,817	2,087	696,471
Lake Huron	1,993	657,862	1,872	618,978	1,503	414,642
Georgian Bay	2,046	723,291	1,919	694,746	1,932	569,414
West Midland	2,869	1,203,456	2,463	1,201,424	2,324	1,095,364
Lake Ontario	4,479	2,552,273	4,306	2,280,734	4,084	2,539,027
St. Lawrence and Ottawa	2,990	1,379,862	2,475	1,067,231	2,218	1,120,099
East Midland	1,619	610,695	1,576	752,620	1,470	679,519
Northern Districts	831	1,306,308	667	1,426,308	596	377,372
The Province	19,418	9,504,388	17,903	8,978,858	16,214	7,491,908

The number of mortgages has increased in every group of counties, but only in the last two has the amount been diminished.

Our investigations, however, lead us to particularise the class 'farmers,' and the following table shows the growth or falling off of the chattel debt of this class by groups of counties and for the province as it stood on December 31, 1889, 1890 and 1891 :

Districts.	1891.		1890.		1889.	
	No.	Amount.	No.	Amount.	No.	Amount.
		$		$		$
Lake Erie	1,788	400,273	1,674	443,172	1,108	261,788
Lake Huron	1,354	326,030	1,429	397,627	1,097	269,245
Georgian Bay	1,570	395,805	1,481	357,255	1,474	283,348
West Midland	1,362	477,591	1,434	528,131	1,250	464,283
Lake Ontario	1,776	708,373	1,666	729,368	1,564	732,676
St. Lawrence and Ottawa	1,513	384,306	1,376	352,903	1,090	273,182
East Midland	1,107	320,606	1,123	355,005	952	313,196
Northern Districts	519	84,617	378	59,836	302	49,840
The Province	10,989	3,097,601	10,561	3,223,297	8,877	2,647,558

The number of instruments has increased but not to such an extent as in 1890. On the other hand the aggregate value has diminished so that the average chattel mortgage outstanding against the farmer so borrowing was $282 in 1891 against $305 in 1890 and $298 in 1889. Nearly 57 per cent. of the total number of instruments on record in 1891 are classed as farmers, the ratio ranging from 40 per cent. in the Lake Ontario counties to 78 per cent. in the Georgian Bay group (Grey and Simcoe).

CHATTEL MORTGAGES—BY COUNTY DIVISIONS.

TABLE I. Showing by County Municipalities of Ontario the total number and amount of Chattel Mortgages and Renewals on record and undischarged on January 1 and December 31, 1891.

Counties or Districts.	Chattel mortgages on record January 1, 1891.				Chattel mortgages on record December 31, 1891.			
	To secure existing debt.		For future indorsation.		To secure existing debt.		For future indorsation.	
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.
		$		$		$		$
*Algoma and Nipissing	317	727,398	8	414,786	413	516,140	11	420,473
Brant	404	170,872	23	7,656	443	180,767	2	402
Bruce	877	286,698	13	5,299	847	289,576	13	2,052
Carleton	587	362,310	9	28,447	627	426,144	11	14,643
Dufferin	194	65,330	19	9,311	246	73,130	13	6,157
Elgin	387	124,206	34	8,884	399	145,871	28	8,147
Essex	540	168,639	44	13,215	501	196,985	40	18,510
Frontenac	341	126,729	....	....	420	154,003	....	....
Grey	1130	314,759	....	.....	1220	329,982	....	.....
Haldimand	196	57,443	1	250	222	50,051	1	310
Haliburton	95	74,576	....	.....	84	12,492	....	.. ..
Halton	136	56,017	....	....	166	62,448	2	1,518
Hastings	775	232,731	48	20,598	835	259,215	40	19,801
Huron	467	148,987	111	48,809	541	173,191	32	16,374
Kent	877	310,326	29	18,257	956	285,074	38	8,842
Lambton	363	117,879	41	11,306	497	145,225	63	31,444
Lanark	196	67,314	1	3,906	201	104,417	11	8,984
Leeds and Grenville	347	132,883	13	5,698	414	152,248	....	....
Lennox and Addington	195	80,857	5	4,120	210	91,719	7	4,752
Lincoln	276	188,333	9	2,956	257	124,417	20	17,607
Middlesex	549	284,367	1	3,000	760	302,517	6	6,206
Muskoka and Parry Sound	340	252,904	2	31,220	396	260,719	11	108,976
Norfolk	232	57,106	10	1,941	268	78,301	....	.....
Northumberland and Durham	697	355,896	43	18,716	740	369,444	6	5,071
Ontario	435	164,275	35	15,608	459	269,745	27	12,412
Oxford	309	135,725	2	36,000	323	141,038	3	14,342
Peel	159	137,257	1	202	171	115,554	....	....
Perth	305	143,292	14	8,061	280	167,172	16	6,542
Peterborough	286	166,264	20	7,296	292	150,998	17	6,404
Prescott and Russell	232	77,849	....	.....	258	107,009	1	150
Prince Edward	287	81,817	5	1,964	234	71,774	17	7,490
Renfrew	253	86,926	3	3,704	298	71,375	11	17,650
Simcoe	789	379,987	....	.....	786	393 309	...	.....
Stormont, Dundas and Glengarry	289	82,438	4	4,050	423	205,187	8	21,581
Victoria	349	231,655	3	19,500	350	157,755	1	4,000
Waterloo	131	74,499	5	28,110	169	112,010	12	40,108
Welland	259	146,803	16	29,747	326	173,539	11	15,041
Wellington	469	209,686	58	23,515	509	214,970	18	28,095
Wentworth	455	303,932	22	19,410	523	320,016	13	24,037
York	1,746	934,351	....	....	1,838	1,199,890	6	10,850
The Province	17,271	8,121,316	632	857,542	18,902	8,595,417	516	908,971

*Including Manitoulin, Rainy River and Thunder Bay.

CHATTEL MORTGAGES—BY OCCUPATIONS.

TABLE II. Showing by occupations or callings of mortgagors the number and amount of Chattel Mortgages and Renewals on record and undischarged on January 1 and December 31, 1891 respectively in the province of Ontario.

Occupations.	Chattel mortgages on record January 1, 1891.				Chattel mortgages on record December 31st, 1891.			
	To secure existing debt.		For future indorsation.		To secure existing debt.		For future indorsation.	
	No.	Amount.	No.	Amount	No.	Amount.	No.	Amount
		$		$		$		$
Agent	237	73,263	6	4,672	274	101,302	7	10,133
Bailiff	12	1,915	....	.....	13	1,986	....	.....
Baker and confectioner	92	31,016	2	500	103	38,457	...	.....
Barber	65	16,494	5	752	80	14,545	5	1,600
Barrister and solicitor	50	62,775	3	2,677	59	41,400	1	2,500
Billiard room	20	9,160	....	.....	9	3,898	....	.....
Blacksmith	86	15,794	5	810	97	18,378	2	300
Boarding-house keeper	15	2,764	....	.....	20	4,727	....	.....
Book-keeper and accountant	48	29,478	...	.....	67	24,111	1	74
Brickmaker	43	25,221	2	365	39	31,393	....	.....
Builder and contractor	101	43,681	3	1,412	164	194,471	7	6,979
Butcher	155	43,083	5	1,270	175	44,147	1	172
Cabinet maker	20	13,628	4	1,849	26	11,667	2	365
Cabman	52	15,591	....	.....	59	15,204	1	150
Carpenter	157	32,005	3	280	155	30,782	1	178
Carriage maker	48	38,155	1	116	61	30,372	3	578
Carter	22	3,609	1	15	56	10,017	4	663
Clergyman	23	5,062	..	.. ....	14	4,916	1	1,200
Clerk	210	72,979	....	.....	239	72,121	2	813
Coal and wood dealer	15	6,781	1	550	13	4,805	....	.....
Cooper	10	2,391	....	.... ..	18	3,145	....	.....
Dairyman	38	17,098	2	541	43	9,925	..	....
Druggist	60	63,147	..	.....	63	74,679	5	2,378
Engineer	14	2,020	....	.....	50	19,011	....	.....
Farmer (including yeoman)	10,163	3,090,664	398	132,633	10,748	3,035,342	241	62,259
Furniture dealer	9	3,308	....	.....	32	18,827	1	474
Gardener	46	7,074	3	250	67	14,399	1	50
Gentleman	221	134,872	9	5,784	204	94,091	8	17,099
Harness maker	36	8,577	1	100	36	10,491	....	.....
Hotel-keeper and liquor shop	536	510,911	10	9,504	554	656,473	18	6,070
Jeweller and watchmaker	61	59,022	2	2,564	52	40,399	3	1,619
Laborer	409	43,359	8	1,318	415	45,177	5	412
Laundryman	12	4,960	2	1,000	21	15,617	1	300
Livery keeper	139	86,133	3	2,242	181	123,304	6	6,782
Lumberman	128	1,096,697	7	474,465	124	727,318	16	519,076
Machinist	55	35,025	....	.....	52	31,612	....	.....
Manufacturer	257	408,733	13	48,957	238	517,411	23	67,153
Marble dealer	5	922	1	80	13	2,623	3	351
Married woman	317	108,557	6	2,465	441	207,343	12	14,574
Merchant	519	701,111	32	76,337	584	632,166	62	135,655
Miller	53	38,999	5	4,215	71	29,851	6	12,953
Moulder	12	2,358	1	108	9	1,120	....	.....
Painter	51	8,550	....	.....	63	12,100	...	... ...
Photographer	35	10,940	1	100	39	9,978	3	312
Physician	56	26,568	1	880	64	33,774	. .	... ...
Plasterer	21	3,124	1	249	22	2,687	....	....
Plumber	12	5,023	....	.....	13	3,821	1	1,000
Printer and publisher	188	180,063	3	1,811	186	227,327	4	4,240
Salesman	16	2,883	1	750	11	4,653	....	.....
Saw-mill man	43	22,439	4	3,150	67	58,401	2	1,793
Shoemaker	43	14,314	..	.....	50	13,876	..	.....
Tailor	62	21,707	1	3,000	75	25,834	1	100
Teamster	273	43,879	7	3,910	300	43,725	4	949
Tinsmith	22	9,237	....	.....	22	7,317	1	300
Traveller	42	13,244	....	.....	59	14,378	1	500
Undertaker	35	16,707	1	300	24	14,200	....	.....
Unmarried woman	61	14,189	3	1,949	46	19,498	5	1,961
Widow	137	44,986	5	1,256	187	56,174	2	406
All others	1,603	715,071	60	62,356	1,935	1,008,651	43	24,500
Total	17,271	8,121,316	632	857,542	18,902	8,595,417	516	908,971

ANNUAL REPORT

OF THE

CENTRAL FARMERS' INSTITUTE

FOR THE

PROVINCE OF ONTARIO

1891

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

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OFFICERS FOR 1892.

President	NICHOLAS AWREY, M.P.P	Binbrook.
Vice-President	T. LLOYD JONES	Burford.
Secretary-Treasurer	A H. PETTIT	Grimsby.
Auditors	R. W. GREGORY	St. Catharines.
	WM. COWAN, V.S	Galt.
Directors :		
Division No. 1	JOHN CLARKSON	Chatham.
" No. 2	THOMAS KELLS	Vandeleur.
" No. 3	MURRAY PETTIT	Winona.
" No. 4	D. E. SMITH	Churchville.
" No. 5	J. B. EWING	Dartford.
" No. 6	T. G. RAYNOR	Rosehall.
" No. 7	W. J. MCNAUGHTON	Lancaster.

FIFTH ANNUAL REPORT

OF THE

CENTRAL FARMERS' INSTITUTE.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to submit herewith the proceedings of the fifth annual meeting of the Central Farmers' Institute of Ontario.

It contains a full report of papers read and discussion thereon, together with the report of the Executive Committee and Treasurer's Abstract, and also a list of the Secretaries of the Electoral District Institutes for 1892.

I have the honor to be, Sir,

Your obedient servant,

A. H. PETTIT,

Secretary.

FIFTH ANNUAL MEETING

OF THE

CENTRAL FARMERS' INSTITUTE

The fifth annual meeting of the Central Farmers' Institute, of Ontario, was held in Victoria Hall, in the city of Toronto, Feburary 2nd, 3rd and 4th, 1892, the President, Mr. N. Awrey, M.P.P., in the chair.

The meeting was called to order at 2.30 p.m., when the Hon. Mr. Dryden, Minister of Agriculture for Ontario, was invited to address the meeting.

ADDRESS BY HON. JOHN DRYDEN.

Mr. President and Gentlemen: I want to congratulate the President and delegates here on the successful issue of this Institute meeting. A number of years ago when this Central Institute was first originated, I don't know that it was very well planned by anybody, it was a new idea; it took hold of the people and they rallied around it. I remember at that time a good many persons pooh-poohed the thing, fought shy of it and let it severely alone; but you have not been organised very long, and to-day this Institute commands the respect of every one in this country of ours. (Hear, hear). There is no political party, no set of people in this country anywhere, but listen very attentively to what the delegates assembled have to say. I do not live in this city, otherwise I would like to extend to you a welcome to Toronto, which is perhaps the most central place in which you can gather, where you may feel most at home, and be enabled the best to perform the business you have to do. I have noticed the work that is being done in the different local Institutes does not appear the same in all sections of the country. There are some sections in which the gatherings are enthusiastic, well attended; every farmer in the neighborhood seems to take a deep interest. Not only is he desirous of learning what he can, but of communicating whatever knowledge he has to give. It was my privilege to go into the eastern section, and from what I saw and heard from others I am bound to say the Institute meetings there are a greater success than they are in this central portion of Ontario. We have been looking at the people down in the east as away behind us, and they seemed to have accepted the situation; but I was astounded when driving through a portion of the counties of Prescott and Russell to find that we have nothing in the county of Ontario to compare with the appearance of that country, and these people were wide awake in the Institute meeting. They seem to take it for granted that we people in the portions of the country especially that have been longer settled have a good deal more knowledge than they have, and they are anxious to get whatever information they can. I am glad to know that your membership is increasing year by year, and what I want to say to you in this connection is, that I would urge upon you to do what you can to increase the membership, and I have a special reason for it, viz, that I have undertaken from my Department to give you whatever information I can in the way of bulletins, reports, etc., and I cannot reach the people if they will not give me a chance. I would like you to increase your membership by five or ten this present year. There are no politics in this Institute, but we do need to help each other. I do not think much of the word "combine," but I do of the word "co-operation," and I want this word to ring in your ears. If we will stand by each other we can do great things in our country; we will become a great power in this land for our own good. (Applause).

Moved and seconded that the minutes of last meeting as printed and included in annual report be accepted as having been read. Carried.

A letter was read from Steele Bros. & Co., inviting the members to visit their warehouses on Front street, Toronto.

REPORT OF COMMITTEE ON CREDENTIALS, 1892.

The report of the Committee on Credentials was then read and adopted.

Institute delegate.	P. O. address.
ADDINGTON:	
M. Shannon	Centreville.
Wm. Nugent	Newburgh.
BRANT, N.:	
J. F. Patton	St. George.
BRANT, S.:	
T. L. Jones	Burford.
Thos. A. Good	Brantford.
BROCKVILLE:	
Jas. Neilson	Lyn.
Wm. H. McNish	Lyn.
BRUCE, C.:	
Wm. McBride	Paisley.
Henry Brown	Chesley.
BRUCE, N.:	
John Douglas	Tara.
J. B. Muir	North Bruce.
BRUCE, S.:	
R. E. Little	Teeswater.
James A. Lamb	Walkerton.
CARLETON:	
Edward Kidd	North Gower.
Charles Mohr	Mohr's Corners.
DUFFERIN:	
Geo. Island	Orangeville.
W. J. Sproule	Shelburne.
DUNDAS:	
Peter McIntosh	Cass Bridge.
James Collison	Dixon's Corners.
DURHAM, W.:	
H. C. Hoar	Bowmanville.
ELGIN, E.:	
Francis Leeson	Aylmer (West).
J. C. Dance	Kingsmill.
ELGIN, W.:	
Mungo McNabb	Cowal.
Samuel Maccoll	Cowal.
FRONTENAC:	
David Rogers	Kingston.
Alex. Ritchie	Inverary.
GLENGARRY:	
J. L. Wilson	Alexandria.
R. R. Sangster	Lancaster.
GRENVILLE, S.:	
W. H. Thompson	Prescott.
James Bissell	Brockville.
GREY, C.:	
John Clinton	Maxwell.
John Irwin	Red Wing.
GREY, N.:	
A. Gifford	Meaford.
Wm. A. Brown	Owen Sound.
GREY, S.:	
Thomas Brown	Holstein.
W. J. Young	Durham.
HALDIMAND:	
J. H. Best	Balmoral.
Matthew Richardson	Caledonia.
HALTON:	
George E. Fisher	Freeman.
Edwin Peart	Nelson.
HASTINGS, E.:	
J. C. Hanley	Read.
John Stokes	Thomasburg.
HURON, E.:	
Thomas Strachan	Brussels.
Arch. Hislop	Walton.
HURON, S.:	
John B. Henderson	Seaforth.
HURON, W.:	
Henry Morris	Goderich.
KENT, E.:	
Charles Brown	Kent Bridge.
James Crookshank	Thamesville.
KENT, W.:	
John Clarkson	Chatham.
John Paxton	Chatham.
LAMBTON, E.:	
Richard Stutt	Forest.
LANARK, N.:	
E. M. Simpson	Almonte.
Alex. McLean	Carleton Place.
LANARK, S.:	
George Oliver	Perth (Box 197).
N. McLenaghan, M.P.	Perth.
LEEDS, S.:	
W. M. Bass	Newboro'.
Holmes Eyre	Harlem.
C. F. Rath	Lansdowne.
LENNOX:	
Wm. J. Chambers	Chambers.
H. Aylesworth	Deseronto.
LINCOLN:	
Alex. Servos	Niagara.
R. W. Gregory	St. Catharines.
MIDDLESEX, E.:	
Elliot Grieve	Wilton Grove.
Richard Venning	Mossley.
MIDDLESEX, N.:	
S. P. Zavitz	Coldstream.
W. H. Taylor	Parkhill.
MIDDLESEX, W.:	
George Scates	Appin.
Wm. H. Sutherland	Napier.
MONCK:	
H. Crawford	Canboro'.
MUSKOKA:	
John Hollingworth	Beatrice.
NORFOLK, N.:	
L. F. Sovereign	Waterford.
Oscar McMichael	Waterford.
NORFOLK, S.:	
Albert Gilbert	Simcoe.
A. W. Smith	Simcoe.

REPORT OF COMMITTEE ON CREDENTIALS, 1892.

Institute delegate.	P. O. address.
NORTHUMBERLAND, E.:	
J. B. Ewing	Dartford.
W. H. Phillips	Frankford.
NORTHUMBERLAND, W.:	
R. Cullis	Camborne.
Platt Hinman	Grafton.
ONTARIO, N.:	
Leonard Burnett	Greenbank.
John Veale	Beaverton.
ONTARIO, S.:	
G. E. Mowbray	Oshawa.
Andrew Annis	Oshawa.
OXFORD, N.:	
Absalom Glaves	Hickson.
OXFORD, S.:	
Wm. Colyer	Ingersoll.
J. N. Chambers	Woodstock.
PEEL:	
J. Pickering	Brampton.
D. E. Smith	Churchville.
PERTH, N.:	
Wm. Dickson	Atwood.
Henry Doering	Milverton.
PERTH, S.:	
R. G. Ratcliffe	Anderson.
John Burns	Kirkton.
PETERBOROUGH, E.:	
Frank Birdsall	Birdsalls.
Robert Burgess	Norwood.
PETERBOROUGH, W.:	
Dawson Kennedy	Peterborough.
Wm. Collins	Peterborough.
PRESCOTT:	
Wm. McAdam	Vankleek Hill.
Dennis Hurley	Vankleek Hill.
PRINCE EDWARD:	
A. S. Yarwood	Picton.
Alfred Brown	Bethel.
T. G. Raynor	Rose Hall.
RENFREW, S.:	
Wm. Airth	Renfrew.
SIMCOE, E.:	
George Raikes	Barrie.
SIMCOE, S.:	
James A. Kidd	Cookstown.
Geo. Duff	Cookstown.
SIMCOE, W.:	
Charles Lawrence	Collingwood.
STORMONT:	
Victor Pegg	Moose Creek.
J. D. McInnes	Berwick.
VICTORIA, E.:	
John Morgan	Bobcaygeon.
W. H. Stevenson	Fenelon Falls.
WATERLOO, S.:	
R. C. Tye	Haysville.
A. S. Elliott	Galt.
WELLAND:	
J. F. Beam	Black Creek.
E. Morden	Niagara Falls So.
WELLINGTON, C.:	
W. L. Gordon	Elora.
WELLINGTON, S.:	
G. B. Hood	Guelph.
Andrew Whitelaw	Guelph.
WELLINGTON, W.:	
W. L. Bell	Drayton.
Phineas Henry	Drayton.
James McEwing	Drayton.
WENTWORTH, N.:	
J. L. Robertson	Strabane.
Samuel Hunter	Rockton.
WENTWORTH S.:	
Erland Lee	Stoney Creek.
T. A. Walker	Ancaster.
Murray Pettit	Winona.
A. H. Pettit	Grimsby.
Nicholas Awrey	Binbrook.
YORK:	
Lyman Kennedy	Agincourt.
George Elliott	Agincourt.
YORK, N.:	
R. W. Phillips	Newmarket.
J. R. Kandall	Newmarket.
YORK, W.:	
Wm. Clark	Fairbank.

Other Associations.	Delegate.	P. O. address.
Agricultural and Experimental Union	C. A. Zavitz	Guelph.
Agriculture and Arts Association	Joshua Legge	Gananoque.
Ayrshire Breeders' Association	Joseph Yuill	Carleton Place.
Bee-keepers' Association	Allen Pringle	Selby.
Clydesdale Association	David McCrae	Guelph.
Fruit Growers' Association	A. McD. Allan	Toronto.
	L. Woolverton	Grimsby.
Markham Farmers' Club	J. Pike	Markham.
Ontario Agricultural College	James Mills	Guelph.
Shire Horse Breeders' Association	Henry Wade	Toronto.
Stock Breeders' Association	C. M. Simmons	Ivan.
Western Dairymen's Association	J. A. Leitch	Glencoe.
	Hon. Thomas Ballantyne	Stratford.

REPORT OF THE EXECUTIVE COMMITTEE.

To the Officers and Members of the Central Farmers' Institute of Ontario:

GENTLEMEN,—The executive Committee beg to tender the following report:

That we have during the year held three executive meetings. The first at the close of the annual meeting, members all present; a resolution granting ten dollars each to the committee, re Anti Combines Bill, for expenses incurred therewith, also a resolution increasing the secretary's salary fifty dollars.

The second meeting held in Toronto on the 3rd of July, Mr. Nicholas Awrey, President, in the chair, all the members present. The arrangement of the order paper for the next annual meeting was considered and the secretary instructed to invite the different speakers chosen to introduce the subjects named in the order paper (a copy of which was mailed to the secretary), together with a request that Institutes would forward at an early date any subjects they might wish to have added to the order paper. The President was appointed on behalf of the Central Farmers' Institute to confer with President James Mills, O. A. College, in the arrangement of speakers to attend Institute meetings in January, 1892.

A meeting of the Executive Committee was held at Toronto, September 15th, members all present except Mr. T. G. Raynor. The President submitted for consideration the propriety of holding a Provincial Farmers' Picnic at some central point in Ontario during the summer of 1892. After a lengthy discussion a committee was appointed to consider as to the most suitable place and report next day. The committee reported as follows: That a Provincial Farmers' Picnic be held and a committee be appointed consisting of the President, Mr. Pettit and the Secretary, to confer with the Grimsby Park Co. and report to the Executive Committee on the first day of the annual meeting.

ABSTRACT OF TREASURER'S ACCOUNT.

RECEIPTS.

February 3rd, 1891, balance on hand from last year	$ 390 72
May 28th, 1891, grant from Ontario Government	1,600 00
	$1,990 72

DISBURSEMENTS.

Printing 1890 and 1891	$ 10 75
Stenographer	60 00
Delegation *re* Anti Combines Bill	30 00
Delegation *re* Fruit Inspection	151 25
Executive Committee	251 20
Printing annual report	650 00
Expenses Executive Committee	252 50
Postage, express, telegrams, stationery, &c	29 06
Salary Secretary-Treasurer	250 00
Balance on hand	305 96
	$1,990 72

Signed on behalf of the Executive Committee,

A. H. PETTIT,

GRIMSBY, February 1st, 1892. Secretary-Treasurer.

Moved that the report of the Executive Committee and financial report of the Secretary be accepted as read. Carried.

Mr. GEO. DUFF.—Is not $600 a large sum for printing the Annual Report?

The SECRETARY.—Our reports in the past have been very meagre, and I was requested this year to get one that would be creditable to the association. Twelve thousand copies were printed. It has been printed as cheaply as possible.

Mr. DUFF.—It seemed to strike me as high. I was not acquainted with the number you had to obtain. I am willing to accept your explanation

The following report of the Auditors was then read and adopted :

To the President, Officers and Members of the Central Farmers' Institute :

GENTLEMEN,—We, the undersigned Auditors, beg to report that we have examined the vouchers of the Treasurer of the Central Institute and compared them with his book, and find the same correct as per printed report.

W. COWAN, } Auditors.
THOS. A. GOOD, }

TORONTO, February 2nd, 1892.

THE PRESIDENT'S ADDRESS.

Gentlemen—Representatives of the various Institutes of Ontario : It affords me, as President of your Institution, a great deal of pleasure to greet you at this our fifth annual meeting, and to congratulate you upon the interest that you are now taking in the work of our Institute. It will not be out of place for me to refer to the progress made since we conceived the idea of establishing this, which after all is our Provincial Farmers' Parliament. At that time, five years ago, we had a very few Institutes in this Province, and those were very uncertain in their aim, and lacked energy in discharging their work. We have now an Institute in almost every electoral district in the Province and, with very few exceptions, full of life and energy. At that time our membership did not reach one thousand ; to day we have a membership reaching almost fifteen thousand of farmers, who appear to have a common object, and who have, I am bound to say, a higher aim and nobler aspirations in their work of making our calling a successful and honorable one. In fact, gentlemen, we are now recognised as one of the established institutions of this country. Our reports are being printed and circulated by the Department of Agriculture and read by thousands of people throughout the Province. I may say more than that, that the Provinces of Manitoba and British Columbia have asked us to provide them with a form of constitution upon which they are basing Institutes similar to our own. And I may say more than that, that our work is being recognised by the farmers of this Dominion from the Atlantic to the Pacific ocean. In Nova Scotia and New Brunswick, and, as I have said before, in British Columbia, they are copying after our Institutes, and are forming Institutes in each of their electoral districts, and now propose to have a Central Institute as we have in Ontario. I have mentioned those things to you for more than one reason. One and the greatest is that I desire you to conduct your debates with becoming dignity. I want you to remember that the time has arrived when we can no longer afford to discuss questions that are not of interest, or to dwell on subjects that are not of importance to the people of this Province, for the reason that our reports when they are read should be for the farmers of this Province—mines from which they may dig gems useful to them in their life's work. The time has passed when we can afford to assemble from year to year to discourse petty subjects or indulge in the discussion of those questions which do not affect the material prosperity of the farmers of Ontario.

Since we last met a year has passed and it has been a fateful year to the British Empire. We have all mourned, as good British subjects should, over the grave of one who was to have been their king. The palace in the old country in our motherland has been visited by death, and one of the princes of the land has been taken away from the British people. We have this year stood by the grave, however much we may differ in political opinions, of Sir John A. Macdonald, a man who formed no unimportant part in framing the destiny of this Dominion of Canada. The palace as well as the cottage has been visited by the dark winged messenger, but yet we have this to say : we can thank our Maker after all these things that the British Empire still lives and our country exists. Our troubles have not been unmixed with mercy, because a kind Providence has given us

in this country peace and has blessed us with a bountiful harvest. These are things which as farmers, we at least in the Province of Ontario, ought to feel grateful for.

I intend to ask your attention to-day to several subjects which I think of more than ordinary importance to the farmers of the Province of Ontario. I intend to ask you to discuss them calmly and with deliberation, to approach them without feeling that you are bound by party exigencies to take any particular view of any question that comes before us for discussion. We are to have during the course of this meeting papers read by prominent public men. We are to have the Hon. Mr. Carling who perhaps will discuss a question which to some of us in its bearings as presented to this meeting may not meet with our approval, that is when he discusses the question of the English market for the products of the Canadian farmer, but I ask all those who may differ with the honorable gentleman to approach the subject, forgetting for the time being they are politicians, and gleaning all they can from his remarks and if they discuss it to do so as business men.

I propose to speak to you this afternoon upon one question, and when I introduce it some of you may say that I am verging very closely upon the domain of politics, but I think that all of you will give me credit when I am through with the discussion of it of not having said one word that can wound the most sensitive party man that may be before me. I propose to discuss it from a farmer's standpoint, and I want you men all to discuss it and to weigh what I may say as farmers and not as politicians. You may have noticed—if you did not I certainly did—a meeting of the Manufacturers' Association that met on the 15th of Jan. of this year in the city of Toronto. They met to discuss questions of material importance to them as business men, to discuss that which was of vital importance to them in their calling. I say to you gentlemen that they forget in the discussion of those questions that they were politicians at all, and they only remember that they were business men. They discussed it upon these lines: What particular policy is going to put the most money into our pockets as manufacturers? And let us discuss our questions if we do so at all from the same lines, forgetting that we are party men and remembering alone that we are farmers, and that, after all, the great business with us as farmers is to consider questions from the standpoint, "Is it going to materially advance our interests as tillers of the soil?" That is what I want you to do and will expect you to discuss it from that standpoint. I would not have objected so very much to the President of the Manufacturers' Association's remarks if he had not, after discussing the question from his peculiar standpoint, attempted to read a lecture to the farmers of Ontario. He attempted to point out to us the particular line of action which we should pursue. He did more than that. He asked us to consent to be kept out of certain markets in order that they as manufacturers might place upon their goods without competition from any other land, a price that might be fixed by themselves, regulated by their own combination. He went further than that, even as far as to advise the farmers what course of action they should pursue, and it is to that part I object. After discussing the question as to the introduction of competition in manufactured goods, and after he had expressed uncompromising opposition to it, he then used the following language to the farmers of the Province of Ontario:

"That for the surplus which has to be exported because it cannot be consumed at home, our best market is not the United States, which produces $10 to our one dollar of agricultural products, and is our most formidable competitor in the European markets, but Great Britain, the market to which we both send our surplus, and which in a general way absorbs the surplus agricultural products of the whole world. The foreign markets that Canada should specially cultivate are not, in our opinion, those whose products are exactly the same as our own and who are our direct competitors in other countries, but those which are consumers of the products we have to dispose of, and who in return desire to sell us articles which cannot be produced in Canada. For this reason we heartily commend the efforts which the Government have been and are now making to cheapen and facilitate the transport of goods to the British and other European markets, and also to open up closer trade relations with the West Indian Islands, Cuba, South America, Australia, China and Japan."

I propose to show you, irrespective of what our opinion may be upon any other question, that his argument certainly was not correct—it was altogether misleading—that he was not accurate in his calculations, and I think I can prove it to you from the public documents. There are many articles the products of Ontario with which the people of the United States do not compete in the English markets with us. There are thousands of dollars worth of goods if it were not for the barrier between the two countries that the

American buyers would be invading our markets to buy. Let me give you an example. I quote now from the Trade and Navigation Returns of 1890. I want to show you just where our market is, and where we as farmers should ask that we might be allowed to send our products. I intend to show you that it is not a political question because we all agree upon this question as far as agricultural products are concerned. The following shows our exports of a few articles for 1890 :

Article.	Exported to Great Britain.	Exported to the U. States.	Article.	Exported to Great Britain,	Exported to the U. States.
Horses	$17,925	$1,959,355	Eggs	$ 820	$1,793,803
Sheep	486,299	764,217	Hides	28,082	477,680
Poultry	.....	49,233	Wool	.....	248,598
Barley	12,017	4,582,575	Flax	.....	175,563
Beans	1,292	250,769	Rye	53,413	113,320
Hay	109,634	922,727	Hemp	.....	26,568
Malt	.....	149,551	Tobacco Leaf	.....	50,076
Potatoes	.....	308,915	Canned Fruit	6,612	24,022
			Total	$716,094	$11,896,972

Or in plain language the United States purchased sixteen times as many dollars worth of these particular articles as did Great Britain and yet the President of the Manufacturers' Association says to us farmers who have to toil from daylight until dark to be satisfied to be shut out of that market for fear that by allowing competition in goods we as manufacturers may have to sell our goods to you very men just a little bit cheaper.

Let us for a moment consider his advice with regard to cultivating trade with these other countries, and then I am going to ask you, men who like myself have to earn your bread by the sweat of your brow, or by the sweat of your hired-man's brow, whether you consider that this man has a right to say to us men as he did in language which was unmistakable, if you had only read the report of his speech, (it was a magnificent effort I am bound to say from his standpoint,) that we should refuse to cultivate a market of $12,000,000 and if possible cultivate a market with these other men in order that there might be a tariff wall higher and broader still between the two countries on the American continent. Outside of Great Britain our exports to the other countries of the articles of which I have spoken was as follows: The British West Indian Islands bought $73,276 worth; Cuba bought nothing; South America the magnificent amount of $83. Australia not a dollar's worth; China $62, and Japan $64. Or, gentlemen, he says to us, don't buy or sell to these people who will buy $12,000,000 worth from you, but go and cultivate a market with Cuba, China and Japan because they have bought the large amount of $209 worth from you. (Applause.)

Then he went further. He says, I propose to convince the farmers, and he talked to us in a fatherly way as if he was our father confessor. He said plainly to us, there are men who talk to us manufacturers that we would not be hurt by a certain line of action. As he said, we think we know our business better than the men who are talking to us, and then he went on talking to farmers. We think we know our business better than he does, and we think as farmers, although we live upon the cultivation of the soil, that we are not less intelligent than the men are who manufacture the stoves in which we burn our wood and heat our houses. He says, I will convince them that they are prosperous. What does he do? He gives us a tabulated statement of reasons why the people of Canada should be contented, and the farmers especially. He goes on to show that we should be contented, and why we should not seek other channels; why we should not broaden our market or be desirous of selling our goods to all the countries of the world, not one alone but all of them, and he says these are the reasons: Miles of railway constructed from 1878 to 1890, the increase was 7,845 miles. He goes on and gives the increase of tons of shipping in the same year and says the increase is 18,000; the number of letters carried in the Post Office, to prove that we are wealthy and prosperous, the increase being 49,160,000. He refers to the increase of deposits in the banks, and you will be richer when you hear this; you will all feel that there are thousands of dollars at your command. Deposits in the bank, he says, $108,900,000 more than they were. He

tells you of the increase in the export of cattle and that was the only solid argument that the man adduced to prove that we as farmers are prosperous. I say there is no sane man who will attempt to say that a duty upon cattle or upon cheese made any difference to the manufacture of those articles in Canada, because we do not import twenty thousand dollars worth of cheese while we export nearly $10,000,000 worth. The only effect the duty had on these two industries was this, placing the duty upon corn made the cost of production a little higher to those of us who were fattening cattle or making cheese. He speaks of cattle, and I wish to say to this gentleman that we admit that the English market is the best market on the face of the earth for our cattle. We find a ready sale there for all the good cattle that we can export. It is the best market in the world for our cheese, but I want to submit to you this question, gentlemen: Getting free access as farmers to the market of the United States will not prevent our having free access to the English markets. We would have the advantage of two markets instead of one. Then I ask you when he speaks about the banks, do you think that there are many of your agricultural friends that have long bank accounts. How much of this has found its way, by the sale of the products of the farm into the farmers' pockets and from the farmers' pockets into the banks. I am going to leave it with you men who are honest with your consciences, and I believe you will be honest with your country, are you the men who have during the last decade been putting thousands of dollars in the banks? I trow not. I do not know if that is an argument that should be advanced that we as farmers are growing richer under what I consider to be purely restriction of trade. Now he speaks about thousands of miles of railway and he says, farmers, you have that. But I ask you men before me if a great many of you are not paying to-day heavy taxes on account of the bonuses voted by your own municipalities to construct these very roads. I ask you if we are not being to-day taxed at every custom house to pay the interest on the money which enabled the people of this Dominion to construct The Canadian Pacific Railway which comes in largely to make the increase in the mileage, and I am bound to say that I have never regretted the expenditure of that money, because the Canadian Pacific Railway is an undertaking of which we all as Canadians, I care not who, should be proud. It is one that is worthy of the Canadian people, but after all it is no indication that you farmers are wealthy, and that you should submit to what you are now submitting to, and it should be no inducement to refuse if possible having an enlarged market. Now, gentlemen, this is not a political question as I have said before. Both political parties, Grit and Tory alike, declare in no mistaken terms that reciprocal trade relations as far as the products of the farm are concerned, would be to the advantage of the farmer. Every man, I care not where he stands upon a public platform, declares that reciprocal relations as far as natural products are concerned, would be to the advantage of the Canadian people. So I say it is outside the domain of politics. It is a purely business transaction, a question of money for us farmers as to whether we propose to have, if possible, an enlarged market for the products of our farms. I ask you to speak in no unmistakable terms. I ask you to arouse from your apathy and to say to every man, I care not who he may be, that if you want the support of the farmers of this Province, you must be prepared to give them an extended market if it is possible to be got. We as farmers are the most foolish people; we are afraid to speak out on any question, afraid we are going to hurt our party. We are supposed to sit like dumb cysters and bear smilingly all the burden that may be placed upon our shoulders, and we are supposed not to say one word for fear we will hurt either the Grit or the Tory party. I ask you men to be as the manufacturers are in this Province when they meet—men who are business men, who fearlessly speak out their opinions upon all questions; and until you, as the manufacturers do, forget that you are politicians and remember you are business men, not until that time will the period arrive when you will be a power for good in the land. And when that time comes you will be a power irresistible and uncontrollable until you derive your just due. Let your motto be in discussing these questions, "The greatest good to the greatest number." Let us say, "Justice we must have; nothing else will we accept, and nothing more will we ask." And when we ask nothing but justice no injustice can follow, whatever our demands may be, as long as they be reasonable. Now I ask you to consider this question carefully, and in conjunction with what you will hear from the Hon. John

Carling, who is coming to give us his opinion upon possibilities of the English market, and let me say that I will with pleasure listen to him when he unfolds to us what may be perhaps after all to many of us a revelation as to the possibility of our enlarging our markets in Great Britain. But remember, gentlemen, that if we are to succeed, if prosperity is to be our portion, we want all the markets of the earth in which we can lay down the products of our soil. Remember too, that if we want to be successful as farmers that we must follow in the lines of the good old motherland which says to your merchants go and place your goods in every clime, set them down in every market; go glean from the garners and the granaries of all the earth and bring their products and set them down in our midst, untrammelled by any duty which may be placed upon it. They say, give merchant and farmer equal liberty to buy in the cheapest market and to sell where he can get the most for his products. Great Britain has proven by her course that her people have become wealthy, and she has become the greatest mercantile country on the face of the earth by saying, "Go to all the earth and take our goods, and bring back from all other countries the produce of the fields, forests and mines, and you shall be untrammelled in your relations to all the other countries of the earth." Remember when you do that you follow in the footsteps of good old England, which has been, after all, the country after which we might all copy, not alone in that, but in many other relations of life, she being the broadest of all countries as to her trade relations with the people of the world.

And now, gentlemen, I want to direct your attention for a moment to one other question, that is the necessity of us as farmers to make preparations for an exhibition of our products at the Columbian Exhibition to be held in Chicago in 1893. Through the English Government we have been asked to make a display of the fruits of our labor Upon us rests largely the reputation of our country. Thousands from the European nations will look and wonder at the capabilities of our comparatively unknown land I venture to say that thousands of people will be astonished at the warmth of our climate when they see the rich productions of our orchards and vineyards. I believe that by making an exhibit worthy of our province there, that thousands of people will act as immigration agents all over the European continent, after they have seen the exhibition of our flocks and of our herds. If we then as farmers, stock-raisers, dairymen and fruit-growers do our duty, I venture to say that we can make a display at Chicago that will reflect credit upon the province of Ontario and upon the entire Dominion. I think I can promise you one thing: That if we do our share the Dominion and Ontario Governments will do theirs. The Dominion Government has already appointed a Commissioner, Prof. Saunders, and I have the assurance that that Government will grant a large sum of money to pay the cost of transportation and care of the exhibits after they get to Chicago. The Ontario Government, without doubt, will pay for the expense of selection of stock, and I think will grant encouragement in the shape of prizes as an inducement for you to exhibit. Governments and Commissioners can do a great deal, but without the active co-operation of you men their work in a great measure may prove a failure, because it is upon the producers, after all, that rests the responsibility of providing that which will be a credit to the province of Ontario. But remember one thing, gentlemen. You are going to be met with more opposition from the states of the American Union at the next Exposition than you have ever met at any time in the history of this country. They are vieing one with each other to wrest from the province of Ontario its prestige as being one of the finest agricultural countries on the American continent, and take from us the credit we have always had of being the breeding ground from which the people of the United States draw their supply of well-bred animals. They are voting thousands of dollars in addition to the millions that have already been granted by the central government, each state has granted its thousands of dollars in order to compete with you Canadians. New York has given $300,000; Colorado, $100,000; Michigan, $100,000; Ohio, $100,000; Washington, $100,000; Alabama, $100,000; Florida, $100,000; Kansas, $100,000; Dakota, $80,000; Texas, $300,000; Minnesota, $50,000; Montana, $50,000; Maine, $40,000; California, $300,000; Illinois, $800,000; Missouri, $150,000; Pennsylvania, $300,000; Wisconsin, $65,000; Arkansas, $100,000; Georgia, $100,000; Oregon, $100,000; Tennessee, $50,000; Indiana, $75,000; Iowa, $50,000; Nebraska, $50,000, and twelve other

states smaller sums aggregating $350,000. Or in other words, you farmers of the province of Ontario will have to compete against the stock-raisers with their energy backed up as it is by the thousands of dollars voted by the states to induce them to bring the best of their flocks and their grain to compete with you Canadian people. I trust that the Central Farmer's Institute and the different institutes throughout the province will play no inconsiderable part in shewing the people of Europe that Canada after all is the finest country on the American continent, with capabilities grander perhaps than any other country or state that there is on this continent, and it altogether depends on you men. If you do your duty we will have an exhibit at Chicago worthy of the Canadian people; but if you fail, remember, you fail once for all. If from you is wrested what you now have, the credit of being the best stock-raisers on the American continent, if Illinois with this $800,000 win it from you, you might just as well consent to take a second place as stock-raising people on the American continent. For after all, gentlemen, the stock-raisers of Ontario are considered by the American people as having the best, purest and finest stock that there is on this American continent. We even send, occasionally, a pure bred animal across the Atlantic, so great is our prestige now as breeders of good stock. Do your duty, help the governments, help the commissioners to make an exhibit there worthy of the Canadian people, and if you do I believe that we farmers will be blessed hereafter with being able to ship all the stock for breeding purposes that we may have over to the people of the western states. They will come here to get their animals for breeding purposes. But if you fail at Chicago, that prestige will be gone and your chances for sale will entirely vanish.

There is only one other question that I wish to direct your attention to, and that is the great pic-nic that we are going to have. I have always considered that it would be to the advantage of the farmers of the province to gather together once a year at least in some central locality to hear the questions discussed which are of interest to us as a class, and in accordance with a resolution passed by your executive committee, we have made arrangements with the people of Grimsby Park for the use of their magnificent grounds and large auditorium for the purpose of holding a provincial farmers' picnic. We are making arrangements with the different railway companies throughout Canada so that we can take our passengers at a small nominal rate. I may say to you that we have already received assurances from the railway companies which will warrant me in saying that the cost of transit will be so small that there is no farmer in the province of Ontario that cannot afford to go from the most remote corner of this province to Grimsby Park to hear these questions discussed. The Grimsby Park Association have agreed to give us the use of their magnificent grounds. It is a pleasure to look at their broad walks and their lovely flower gardens. It is worth going quite a distance to see that park, lighted with electricity as it is, bordering on Lake Ontario, one of the most pleasant spots on the face of the earth. They say to you, in addition to that we will give large prizes for a band tournament. They propose to have all the bands of the province competing there for prizes, thus to give our farmers the pleasure of one of the greatest musical treats that we have ever had in the province. We intend to do more. We expect to have the ablest men of both sides of politics there to discuss the question of our trade relations. We expect to have if possible Sir John Thompson on the one side and Mr. Laurier on the other, and the well known courtesy of these two gentlemen is a sufficient guarantee that there will not be a word said that will offend a single individual there. We propose to prohibit by any speaker that may go there the use of one word that will be used for political purposes, but they must discuss the question as an abstract one, as a question of political economy, and these two men who are noted throughout the Dominion for being courteous gentlemen will not allow a word to be said that will mar the pleasure or profit of listening to a discussion of that kind. We soon will have the information in the hands of all the secretaries, giving the exact amount that it will cost to go from Lambton and Ottawa down to Grimsby Park. I notice that from Kincardine to Grimsby Park and return it will be about $2.00. The railway companies are determined to do their part as an inducement to the Canadian farmers to get together once a year in thousands if possible, that they may become familiar with each other's wants and if possible personally acquainted one with the other.

I cannot close without expressing to you my very great thanks for the courtesy I have received at your hands during the last three years. It has been to me a labor of love to preside at the meetings and to travel as I have over almost the entire province, attending the institute meetings. I have become acquainted with hundreds and thousands of our enterprising farmers. I have received at your hands nothing but kind treatment, and I can only wish my successor as great a boon as I have received at your hands —that he be treated with the same courtesy as the farmers have treated me in the province. I will close now by hoping that this year coming may be a year of prosperity to you all, and I hope the sunshine and the showers may be sent in order that we may have abundant crops and that success may perch upon the efforts of every individual here present. I hope in addition to this that during the year your families may be encircled with a great deal of pleasure and very little gloom. I hope thousands may be placed in the coffers of the farmers during the next year. I hope that your seed will prosper, that your flocks will be fruitful, that all the good things of life may be vouchsafed to you by a kind Providence, so that when we meet a year hence we all as farmers will say, it has been a good year for the people of the province of Ontario. (Applause.)

Moved by T. Lloyd Jones, seconded by Capt. Servos, and resolved: "That the President's address just delivered be referred to the following gentlemen to report thereon to-morrow afternoon; viz.: Messrs. Roland Gregory, James McEwing, A. Gifford, A. McD. Allan, J. B. Ewing and Joshua Legge.

ELECTION OF OFFICERS.

The following were elected as officers for the ensuing year: President, Nicholas Awrey, M.P.P., Binbrook; Vice-President, T. Lloyd Jones, Burford; Secretary-Treasurer, A. H. Pettit, Grimsby; Auditors, R. W. Gregory, St. Catharines; and Dr. Cowan, Galt. Directors: Division 1, John Clarkson, Chatham; Division 2, Thomas Kells, Vandeleur; Division 3, Murray Pettit, Winona; Division 4, D. E. Smith, Churchville; Division 5, J. B. Ewing, Dartford; Division 6, T. G. Raynor, Rose Hall; Division 7, W. J. McNaughton, Lancaster.

During the election a discussion took place as to the manner and time of voting. Dr. Patten thought that the voting should be by ballot, and another member said that the election should be held on the second day. The President pointed out that according to the constitution the election was to take place on the first day.

Moved by Richard Stutt, seconded by G. E. Mowbray, that the election of officers of this Central Farmers' Institute, be made on the second day of the meeting.

The President.—Mr. Stutt's resolution is out of order unless put in as a notice of motion to amend the constitution by changing a certain rule.

Mr. Good gave notice of motion, "That the election of officers for the Central Farmers' Institute be hereafter held on the morning of the second day, and that it be by ballot."

The President named the following as a committee on New Business: Allen Pringle, Chairman; Henry Brown, J. F. Beam, G. E. Mowbray and Mr. McEwing.

Committee on Legislation—Mr. Morden, Chairman; Dr. Cowan and Messrs. Stutt, Collins and Servos.

Mr. Sproule sent a letter expressing his inability to read his paper on "The Silo as an adjunct to the farm to secure profitable returns from the Shambles and Dairy," owing to the illness of one of his men.

The meeting adjourned at 5 p.m.

EVENING SESSION.

Meeting was resumed at 7.30. The PRESIDENT stated that he regretted to announce that the Hon. John Carling was dangerously ill.

TAXATION OF FARM LANDS WITHIN CITIES, TOWNS AND VILLAGES.

The PRESIDENT then introduced Mr. P. WHELIHAN, who read the following paper:

Should legislation be asked for to remedy the evils at present existing in relation to the taxation of farm lands lying within cities, towns and incorporated villages?

In introducing this subject to this large and representative body, I can only repeat what I said a year ago, and offer the same resolution that I did then, by reading the same and placing it in your hands. This question, Mr. President, may seem of very little importance to rural municipalities, as it does not immediately affect them. But it is nevertheless a grave and important question which affects the interests of a very large number of farmers, and they naturally look to you for sympathy and assistance. To show you how important this question is, and how it affects the farmers in towns and incorporated villages: In the town in which I live there are less than 4,000 inhabitants, and it has only gained one individual in population in the last ten years, as appears by the Dominion census, although situated in the heart of one of the best farming localities in Ontario. With less than 4,000 inhabitants in population, it has an area of 3,214 acres of land, sufficient you will say for the dimensions of a large city. There are over 2,000 acres of this land used solely for farming purposes; about 400 acres more are used by market gardeners and for private paddocks. Now, the rate of taxation on the farming lands inside the corporation is from $100 to $120 per hundred acres, while that immediately outside the corporation is from $27 to $37 per one hundred acres. The farmer inside the corporation is thus assessed for objects from which he derives no benefit, such as street sewerage, asphalt, sidewalks, electric light, fire protection, night watchmen, and police service, and many other things from which he derived no immediate benefit. As a rule he is from one to three miles from the market, and is assessed for the maintenance of a weigh-scale, yet he has to pay for the weighing of any farm produce he wants to have weighed, the same as the farmer outside. He is assessed for the system of sewage that drains the business blocks in town, while at the same time he cannot well afford to drain his own farm. This thing becomes a heavy burden, and almost amounts to confiscation under the present system of taxation, from the fact that no farmer wants to buy such property. If it were a matter of a mortgage of $3,000 or $4,000 incumbrance, a farmer might by economy and perseverance wipe it off, but this he can never wipe off; it is always staring him in the face, and he has the grim satisfaction of leaving it as a legacy to his family to wrestle with.

It might be said in argument that the farmers went in for this incorporation in order to boom their lands; perhaps some of them did so, but there was nothing in those days to deter them from such a course; lands were worth then only from $5 to $10 per acre before the Grand Trunk Railway was built, and the rate was from four to seven mills on the dollar; but when lands are assessed at from $55 to $100 per acre, with the rate at 21 or 22 mills on the dollar, it is a very different thing. Besides this, very few of the first settlers are the owners of these lands to-day.

The farmer, has a rule, has no voice in town councils, and as such institutions are chiefly run by the merchants and business men, they can pass by-laws for the raising of money to boom the business of the town, by granting bonuses, etc., etc. But at the same time they are placing a mortgage on the farm lands within the municipality.

At the last session of the Ontario Legislature, a Bill was before the House aiming at such legislation as would provide a remedy for this grievance. There were large deputations from Belleville, Forest, Parkhill, Stratford, St. Mary's, Guelph, and other places, bringing to bear their influence on the government and on their several representatives to aid them in the matter. But they were very much disheartened when they found, contrary to their expectations, that the legislative committee of this Central Farmers' Institute made no effort to assist them. Your worthy President was the custodian of the Bill

and, gentlemen, I feel it my duty to-day, in your presence, on behalf of myself and the other delegates, to thank him for the very able manner in which he handled this Bill, and fought for the rights of the injured. He proved himself on that occasion to be the right man in the right place. The Bill was postponed to come up again at the coming session, and they now appeal to you for your assistance to enable them to obtain their just rights.

I might say in conclusion, that in seeking this legislation, the farmers are willing to pay their just share of the present indebtedness of their respective cities, towns and villages, as may be ascertained by reference to the County Judge, or to be settled by arbitration. If nothing is done it means ruin to many. I thank you Mr. President and gentlemen for the very patient hearing you have given me.

Moved by Robert C. Tye, seconded by Thos. Kells, "That whereas many farmers at the present time find that lands wholly used for farming purposes lying within cities, towns and villages, have become much depreciated in value, and unprofitable by reason of the taxes in such urban municipalities, and the continuance of such a condition of things would be unjust; be it therefore resolved that this grievance of a large number of farmers throughout this Province, be referred to the Legislative Committee of this Central Farmers' Institute, and we respectfully request said Committee to use their influence at the next session of the Provincial Legislature, in promoting the passage of a Bill as a remedy for such grievance."

Mr. T. Lloyd Jones.—We all know that towns and cities as they grow, are desirous of extending their borders, sometimes for the purpose of "booming" the town and increasing the population, and also to assist them in paying off their indebtedness for improvements. I contend that this is not unreasonable, provided the rural municipality is willing to be incorporated; but where farmers object to be taken in, it is not just that they should be forced in. I think that where lands within a corporation are used for farming purposes, the owner should have the right to withdraw He has as good a right to withdraw as to be forced in. I contend also that land should be assessed according to the rental, not the capital value, because its value to the owner is what it will return if rented.

Mr. Stewart.—My home is in a village of 650 inhabitants. When I bought my farm of 112 acres the taxation was 4 mills. The population has not increased in 25 years, but the taxation is now 25 mills, and my farm cannot be rented within 20 per cent. of the farm across the road, outside the corporation, and yet I have no advantages that he has not. Merchants who do a business of $20,000 a year are assessed for some $1,000 on their stock, while my farm is assessed for more than it would realise if offered for sale. My town is Embro in Oxford.

Mr. R. Cullis.—The taxation of some of the farms in the riding I come from is greater than their rental. The rate is 23 mills on an assessment, greater than the selling value. If necessary I will give the name of the town.

Mr. Elliot.—It is not right that taxes should be paid for farm land at a fictitious value. I know of farmers who have been compelled to put away their sheep on account of the taxes in the town. We must strike at the root of the matter, allowing corporations to be extended without just cause, although I would be the last to hinder them extending, the moment the land is required for building purposes.

Mr. Morden.—I would be glad if the gentlemen would make some suggestion as to how this legislation is to be brought about. There is an oppression in two ways: first, the assessment; and second, the rate of taxation.

Mr. Awrey.—I have had the honor of having charge of a Bill to, if possible, remedy this very great evil. My purpose was that farm lands within the limits of a city, town, etc., should be assessed only as farm lands, and that they should be relieved from rates for water works, side-walks, fire and police protection, which would perhaps reduce the rate from 15 to 5 or 6 mills. The farmer gets no advantage from these taxes yet, there being only say 15 farmers, the business portion of the city or town has such a preponderating influence that the council leave these people without redress. I know one town in the eastern part of this Province, (I had better not mention it perhaps), I had the advantage of seeing the assessment slips in the town and township for the last thirty years, and the

farmers within that municipality paid $90,000 more taxes than they would have been compelled to pay had they been just outside that imaginary line. I could have carried this Bill if I had submitted to one thing, if I had struck out the word "city" I refused to do it, and my Bill was defeated by 5. I think I can get that Bill through this session. I intend to try, and I will succeed if the Institute stands at my back.

At this stage Mr. Hardy, Commissioner of Crown Lands, and Mr. Harcourt, Provincial Treasurer, were noticed in the rear of the hall, and upon invitation took seats on the platform.

Mr. Brown.—I should be strongly inclined to take the view of Mr. Jones, that the rental value should be the basis of assessment, if I could see how it is to be applied to the residence of a rich man. The rental value of a house worth $6,000 in a village, would be no criterion because no one wants to rent it. The assessor should value a farm not at its fancy value as town property, but its actual value as he would take it from a solvent debtor in payment of a debt. If however, this country was going ahead, a farmer who had two hundred acres or so in a growing town would not sell a quarter of an acre for a village street under a fancy price. That is the reason the Bill was repealed before. This is not a question of sympathy at all, we do not want sympathetic legislation; we do not want class legislation even for the farmer; we want justice done to everybody. I think Mr. Awrey's suggestion is a good one, that where the property receives no benefit from special taxation, fire, water, police, etc., it should be exempt. When you get that done it is all the justice you want.

Mr. Gifford.—I think we should widen this discussion, and I have therefore drafted the following amendment to the resolution: Moved by myself, seconded by Mr. Mohr, "That the Legislative Committee be instructed to take up the question of taxation on farm property in the province of Ontario with a view of making it more equitable to all classes." The amendment was then put and lost, and the original motion carried.

ADDRESS BY HON. R. HARCOURT.

The President then invited Hon. R. Harcourt, Provincial Treasurer, to address the meeting. He said: I assure you that I had not the remotest idea of being honored by this meeting, either to take a seat upon the platform or to address you to-night. I know that what is expected of me is only the saying of a few words, and those of course general. I can say nothing better at the outset than the remark, somewhat trite perhaps, that it is the universal opinion of the province generally that the work of this institute is not only in the right direction but that it is widespread, that it is growing in its influence, that it is being appreciated more and more, and that within the next few years it is destined, I may say, to revolutionise the old methods of farming. With the keen competition that we have now, with the fact before us that on every continent almost wheat is grown in great quantities, with the other fact that owing to railways there is no such thing as distance—markets are not separated as they used to be by long distances, such is the power of the railway and of steam—owing to facts such as these, the keen competition we now have must be expected to become keener as the years go by, and therefore methods of agriculture which might be suitable some years ago fail at this high pressure time to do the work they were calculated to do and did so fairly well some few years ago. It is the object of this institute, and it is accomplishing that object, to suit the times and enable the farming community to cope with these altered and adverse conditions.

I am sure that not only is this Central Institute doing great and good work in the all-important cause of agriculture—the foundation of all our industries—but also the branch institutes, in bringing the work of the institute to each township and the more emote parts of the province.

It was my pleasure a few days ago to listen to a deputation of representative men from the different agricultural societies of the province, and I was very much pleased with the addresses delivered by some of the delegates on that occasion. The point made by those addresses was that during the last say, couple of decades, when these societies

were bringing to bear their influence upon all classes of farmers, upon horticulture as well as agriculture, marked progress has been made from one end of the province to the other. If the good done by the agricultural societies is as marked as it was represented to be, and there is no gainsaying it, then the same gain will in a greater degree be accomplished by this institute and by its local branches.

I congratulate the meeting upon the success attending it. I hope the good work in which it is concerned may prosper. If it does not prosper, then Heaven help our country. If agriculture fails everything else fails with it, for the foundation of our prosperity is gone. Perhaps I may be allowed to repeat the illustration which you have no doubt heard, that any plan which seeks to place as the foundation of a nation's prosperity any industry which really is not the foundation industry, must fail. The money invested in farms and in farm machinery is a capital overwhelmingly larger than that of any other industry and therefore it must be conceded by everyone that that industry must form the foundation stone of the structure. As I love this province and hope that brighter times are in store for it, as I hope that the progress of the next decade may exceed that of the last, then I hope for the welfare of the farmers. Upon that welfare depends the prosperity of this fair province that we love so well.

ADDRESS BY HON. A. S. HARDY.

The President then introduced the Hon. A. S. Hardy, Commissioner of Crown Lands, who spoke as follows: It affords me a great deal of pleasure, unexpectedly though it is, to be introduced to this representative assembly of farmers this evening. It was my good fortune last year to drop in upon an evening somewhat similar to this, and to listen for three or four hours to a very able discussion, and knowing you were in session to-night I thought I would renew the pleasure. I shall not assume to discuss even the broad principles of farming, for it is 35 years since I was a practical farmer. If I did so I should resemble the man of whom it was said that he was a professing Christian but a practising attorney. Or a little as was said of a church by a certain man: "Our church has three distinct branches of membership, there is the latitudinarian, the attitudinarian and the platitudinarian." I am afraid if I were to discuss farming I should give you only platitudes. My friend, Mr. Harcourt, did, however, touch one note that even the man who reads of farming only superficially must recognise, the great changes and great progress, the complete revolution that has been made in farming in thirty years. Even a man who is not very learned in farming could sit down and call the bead roll, and you would be astonished at the mighty strides that have been taken in practical agriculture. I shall not repeat them as they would be commonplaces to you, but to the man who looks back taking perhaps the records of legislation or of practical achievement, the steps are stupendous. There has been true progress in introducing precision where there was but conjecture, and the further you go in that direction the more you will be gratified at the success you have achieved, and the firmness of the foundations you have built and are building for the great agricultural edifice of this country.

I thank you, sir, and I thank you, gentlemen, for the very kind manner in which you have listened to my fragmentary remarks.

LICENSING MALE ANIMALS HELD FOR SERVICE.

Mr. T. G. Raynor then read the following paper: "Would it be in the interests of the stock raisers of the province to have a provincial license imposed upon male animals held by owners for service?"

This is a question on which men differ in opinion, and if it were committed to the farmers for judgment the majority of them would condemn it on the first impulse. With

a little consideration, many, I think, would change their opinion and say, "Yes, let us have such a law." As for myself, I have a strong conviction that this would be in the interests of the farmers.

In order to maintain my position let us consider for a moment the live stock industry as it exists at present, and then as it would exist if such a law as I propose were granted.

It is generally conceded that the older settled portions of our province are especially adapted for the development of this very important branch of the agricultural industry. The rich, luxuriant pastures, the numerous fresh water lakes, rivers and streams with which it is covered, and its exhilarating and disease-germ-destroying climate, naturally help to make these parts such. The number of pure-bred males exported yearly to the States and other parts of our Dominion proves my position beyond a doubt. Although we are still in our infancy with respect to raising pure bred animals, yet we find all over the province men who are paying considerable attention to the rearing of the different breeds of horses, cattle, sheep and pigs ; many, if not all, of whom would be glad to have such a law in force. These breeders have so leavened many parts of this province that a superior class of stock is produced. There are many parts, however, where the majority of the farmers still use scrubs and mongrels. From them we may expect opposition to such a law, because farmers as a class are often slow to move in matters of this kind as it affects their pockets to some extent. They must be convinced that it pays before they will make a change.

The question is then, it seems to me, whether it is better to influence them by law to improve their stock or go on patiently educating them to practice what is for their best interests. That there is need of a change in the general practice of farmers is evidenced by the state of our horse markets. It is well known that a horse which three years ago would have sold for $125 will bring only $80 or $90 now. Yet we continue to raise them notwithstanding the fact that there is a good demand for nice carriage horses as well as heavy draught horses weighing from 1,600 to 1,800 lb. Such horses are worth in the markets to-day from $150 to $600 according to quality.

Although cows kept for dairy purposes should give on an average 5,000 lb. of milk in a season to make them pay, yet we learn that the average for all the cows in the province is much less than that. We naturally conclude from this that some people must be keeping cows at a loss. In this country there is so much poor stock which is consuming the profits made from a better and improved class that it would pay both the owner and buyer if the scrub stock were stamped out.

The breeder of pure bred stock should hail with delight this change, as it would remove from his path many inferior males, half-breeds and scrubs, especially among horses and cattle, and he would have more and a better class of females offered for service.

Several plausible objections may be raised to passing such a law. It may be claimed by some that pure bred animals should be exempt, and that only scrubs and half-breeds be taxed. This would certainly have the desired effect, but it would be discriminating. The owner of a half bred sire might claim that his animal had the power of transmitting to its progeny all its good qualities as effectually as numbers of pure bred sires which do not carry their pedigrees on their backs, and even as well as some of those that do. If this were true, and it might be, the owner of such a half bred sire ought to be willing to pay the license fee. At any rate a tax would not interfere with the owner of such males using them on his own stock. The use of half-breds, however, should be discouraged, as the tendency of their progeny is to revert, *i. e.*, that if there has not been a strain of pure blood passing from one generation by which the good qualities sought in animals are kept constant, there will be a cropping out of the undesirable characteristics of the sire or dam in the progeny.

Others may claim that all should be taxed. There appears to be some injustice in this, as a man is required to pay for improvements, yet we know that this has been our custom for years. If a man improves his property he is forced to pay taxes on those improvements according as they increase the value of his estate. The owner of pure bred

males could afford to pay a tax as he could occupy the ground left to him through the extermination of the scrubs and half breds.

Others may argue that such a law would give the owners of pure bred sires a chance to charge exhorbitant prices for the services of their animals. It might follow, but the law could be so framed as to prevent this by stating a limit of charge for the various breeds of animals. At any rate it would not be long before this matter would right itself by the introduction of more breeding animals.

Again, others may claim that the government has no right to interfere in the matter at all, as it would be infringing on the private citizens rights. In this class will be found those who seem to look at the service of males from a purely financial standpoint—the cheaper the service the better. A seven or eight dollar horse is preferred to a ten or twenty dollar one ; a convenience bull or fifty cent grade to a dollar one ; a loaned ram or boar to one that has a nominal fee placed on him to pay for keep or trouble. If government had a right to say that the farmer should see to cutting the Canada thistle along the road sides ; that he should keep up one half the line fence ; that he should give the right of way for a ditch to carry off the water accumulating on land above his farm, and that he should do statute labor ; then it may be claimed that government has a right to legislate in this matter if it can be shown to be in the interests of the people.

Let us now enquire what results will follow the adoption of such a law. In the first place it would do away with the majority of the inferior sires now so commonly used. Owners of half-bred and scrub sires could not afford to pay a license because of their low service fee and the few females they would be able to get for service. There are some who employ poor sires because they have not sufficient evidence that males claimed to be pure-breds are really so. With a license law they would have a more satisfactory guarantee.

Secondly, it would improve the stock of the country. It is often said that a bull or ram is half the herd or flock. If pure bred sires have such an influence when crossed on pure-bred stock of other breeds or strains, who can estimate their influence when used on our common stock ? We know that the result is very great. One important reason why pure-bred sires should be preferred to scrubs, half-breeds or mongrels, is that the former have been bred for years in the one line in order that certain qualities sought may become permanent. " Like begets like," and therefore only " Best can produce best."

In the third place, improved stock would insure better prices and better management. Consumers are usually willing to pay a good price for a good article. The English market illustrates this in the price paid for Canadian apples, cheese, beef, etc., as compared with the price paid for the same imports from the United States.

Fourthly, better prices would encourage the live stock industry, which, in its turn, would affect the fertility of our soil to such an extent that we could produce per acre larger quantities of grain of a better quality, consequently more stock could be kept as the soil became more productive.

In the fifth place, the revenue of our country would be greatly increased. According to statistics found in the last report of the Bureau of Industries, it is stated that the total number of cattle in the province last year was 1,894,712. Let us now suppose that a good grade two-year old steer is worth $30, while a good scrub steer is worth $20. Here is $10 difference in favor of the grade. A scrub will consume as much food as a grade and when fitted for the block butchers tell us there is another decided difference in favor of the grade. Now, of the 1,894,712 cattle, 347,640 are stores over two years. Allowing that half of them are grades the other half, 173,870, if they were grades, would bring $10 more per head, which would mean a gain to the revenue of this country of $1,738,700 in this item alone.

Thus, while the revenue of our country would be greatly increased, the license fee itself would bring no inconsiderable sum into the treasury of our province to be spent for the general good of our country.

Mr. HOLLINGWORTH.—I say instead of a license fee compel the township council to give the owner a bounty on the animal. By doing this you will enable the owner of the animal to give its services at a less rate.

Mr. EWING.—If we use the best males of all kinds we stand a chance of improving our stock and getting the best prices. If we produce the best we can expect the best prices. We do not need legislation if we will help ourselves.

Mr. YUILL.—It was resolved unanimously at our local institute that all unregistered males pay taxes. My idea is, tax every male, no matter whether scrub or thoroughbred. A great deal of harm is done by allowing scrub or grade mares to run at large.

Mr. CLARKSON.—We should not legislate in this matter, but educate.

Mr. SIMMONS.—I do not believe you can force men into this system. How is it to be managed? It would create an army of officials.

Mr. ALLEN PRINGLE.—I am not in favor of too much government or legislation. I think it would be as difficult to legislate sense into the farmers as it has been found to legislate morality into them; therefore I am in favor of education and moral suasion.

Mr. HANLEY.—I would ask Mr. Raynor whether he would exempt males kept by the owner for his own purposes, as in the case of a dairyman?

The PRESIDENT.—It was simply a man who kept a stallion, etc., for the purpose of charging a fee.

Mr. HANLEY.—In that case I was going to move a resolution as to the necessity for legislation to prevent stock running at large and trespassing.

The PRESIDENT.—There is already a law on the statute book enabling municipalities to do that.

Mr. MOWBRAY.—The men who are breeding scrub animals are being gradually crowded out; the only men who are succeeding are the men who are breeding good stock. If the price of horses has decreased, the trouble is not in the breed but in the tariff between us and the States. Another thing, if you are going to license pure bred animals you would find a great many license fees paid for scrubs. The best thing we can do is to thank the gentleman who read the paper and take no action on it, as I am quite certain the Ontario Government is too wise to pass such a Bill.

Mr. HUNTER.—Is it not the work of the Institute to educate? Education is what is needed and not law.

Dr. COWAN.—Education is all very well, but as it seems to be a very slow process why not try a little coercion with it. Probably a little coercion would be a step in the right direction.

HUGH BROWN.—We have a law in our part of the country to prevent bulls running at large; it is not enforced. If we do not enforce the laws we have, it would be useless to ask us to enforce a stricter law.

Moved by Mr. McEwing, seconded by Mr. Mohr, That this meeting is of the opinion that it would not be advisable to ask the Ontario Government to pass a law taxing all male animals held for service in the province.

Mr. STEWART.—There is another aspect that has not been discussed. There are breeders who are sending animals out to be used by the farmers that are not as represented. We need legislation to protect us against fraud of this kind.

Mr. MCNABB.—What I think should be done is that the Ontario Government should have in every county a qualified man to inspect and license males held for service. I would not charge for the license.

The PRESIDENT.—If only thoroughbred males had been used in Ontario for the last twenty years the stock would to-day be worth $25,000,000 more than it is. If a law as proposed by Mr. Raynor were passed, you may be sure it would not be a dead letter, because when a government gets a chance to levy a tax it may be depended upon to enforce the law, and I venture to say that the law would be a popular one.

Mr. McEwing's motion was then put and lost.

The PRESIDENT.—Then the sense of this meeting is that male animals should be taxed.

VOTE OF CONDOLENCE.

Moved by Mr. Jas. McEwing, seconded by T. Lloyd Jones, That we, the members of the Central Farmers' Institute for the Province of Ontario, desire to place on record our heartfelt sympathy with the Prince of Wales and the other members of the Royal family in the loss sustained through the removal by death of His Royal Highness Albert Victor, Duke of Clarence and Avondale, and that a copy be sent to the Prince of Wales.—Carried.

The foregoing resolution having been forwarded through His Excellency the Governor-General of Canada to Her Majesty the Queen, elicited the following reply :

GOVERNOR-GENERAL'S OFFICE,
OTTAWA, 11th March, 1892.

SIR,—The message of condolence on the occasion of the death of His Royal Highness the Duke of Clarence and Avondale, from the Central Farmers' Institute of Ontario, having been submitted to Her Majesty the Queen and to Their Royal Highnesses the Prince and Princess of Wales, I have now the honor to enclose a copy of a dispatch which His Excellency the Governor-General has received from the Secretary of State for the Colonies, conveying the expression by Her Majesty on behalf of the Royal family of their heartfelt gratitude for this token of loyalty and sympathy.

I have the honor to be, Sir,
Your obedient servant,

KILCOURSIE, A.D.C.,
For the Governor-General's Secretary.

To the Secretary of the Central Farmers' Institute of Ontario.

Lord Knutsford to Lord Stanley of Preston :

DOWNING STREET, 23rd February, 1892.

MY LORD,—I have the honor to acquaint you that I have received and laid before the Queen and the Prince and Princess of Wales your dispatches No. 23 and 33 of the 1st and 8th instant respectively, forwarding further messages of condolence on the occasion of the death of His Royal Highness the Duke of Clarence and Avondale.

Her Majesty the Queen and their Royal Highnesses the Prince and Princess of Wales have been deeply touched by these expressions of sympathy and condolence, and Her Majesty has, on behalf of the Royal Family, commanded me to request that you will convey to the Central Farmers' Institute of Ontario the expression of their sincere gratitude for those tokens of loyalty and sympathy which have been a further source of comfort to them in their bereavement.

I have, etc.,

(Signed) KNUTSFORD.

Governor-General, etc., etc., etc.

WEDNESDAY MORNING SESSION.

The Institute met at 10.30 a.m., the President in the chair.

The report of the Committee on Legislation was read and laid over for future discussion.

Prof. Wm Saunders, Prof. Robertson, Mr. McClenaghan and President Mills, of the Ontario Agricultural College, being present, were invited to the platform.

THE BRITISH MARKETS.

Professor ROBERTSON addressed the Institute on, "The Possibilities of Selling Canadian Farm Products at a Profit in the English Market," as follows: It would be easier for me to address an audience of politicians than an audience of representative farmers. Politicians look mainly for phrases in speeches; farmers expect reliable information and thought. Your President has wisely said that you are a lot of excellent men; and that always puts a speaker on his mettle. He is embarrassed (at any rate I am) lest he should fail to instruct, and he is diffident lest he might fail to do justice to his subject. With your President and yourselves, I am exceedingly sorry that the Minister of Agriculture was not able to come here. On Saturday, Mr. Carling telegraphed that he would be too ill to be present in Toronto, and asked if I could go and give an address, not for him, but instead of him, on the possibilities of selling Canadian farm products at a profit in the English market. He also desired me to express to you his regret that illness prevented him from participating in this meeting.

A subject so great, so important, so far-reaching, would give a man all the task he could very well overtake in a whole year, to enquire, to examine, to read, to collate, to digest, to conclude and to direct. So, if you have some rather imperfectly digested statements, you will please remember that wholesome digestion takes time; and I was not willing to imperil the comfort and health of my own mental digestive apparatus by trying to chew up too many facts and give them out in an unnatural way. You will be good enough to give me your consideration and indulgence this morning, seeing that I have hardly had time to fit myself to present my subject worthily to an audience like this one, representative of the best thought on agriculture in the Province of Ontario, the premier province of the Dominion of Canada, where the average farmer stands head and shoulders above the average farmer in any other land in the world. (Hear, hear). We have many things in this country to be grateful for and proud of. In 'the Old Land' they have, so they claim, a better system of agriculture than prevails generally within our borders. They have had the educated classes, the men trained in sciences, arts and philosophies, the aristocracy of the land, to make plans for the toiling farmers; and the clear thinking of these men has put England away ahead of all other lands in regard to all farm and animal products, which are essentially the product of clear thinking. Where do we go for thoroughbred horses? To England. Where do we go for thoroughbred cattle? To England. For thoroughbred sheep? To England. For thoroughbred swine?

A VOICE.—Do you include Scotland?

Prof. ROBERTSON.—Wait a moment. I say to England, and for me, this morning, England stands for and embraces all of Great Britain. Where do we go for thoroughbred men? Now, my friend, your question. (Laughter.) I have been referring to these matters for this object only, to show that the clear thinking of trained men, of strong intellect, has raised the quality of her agricultural products, until England sends around the globe the foundation and improving stock and seeds for the enterprising farmers of all countries; and her farmers do that, notwithstanding the fact that she has no surplus of ordinary farm products. England affords the best market in the world for food products, acknowledged so by everybody; still she sends the best foundation stock for food products from her island to the uttermost parts of the earth, from the clear thinking of her men. The average farmer in Canada is a better farmer than the average farmer in England. He does not want or need an educated class to stand aloft and aloof and say, do so and so. He does not want to have one man as the master, to do the thinking, and the other man as the hind, to do the working, but he, in himself, has the opportunity (which farmers in other lands have not in an equal measure to-day,) of governing the products of his own hands, according to the direction of his own mind. He, more than most others, is the man who has the right to think for himself, the man who has the need of thinking for himself, and the man who has the opportunity, in our country, of giving expression to his thought, through his work as well as his words. The meaning and promise of this meeting are better stock and products of all kinds,

better prices for all kinds, better work of all kinds, larger profits of all kinds, from the clear thinking induced by discussion and the dissemination of knowledge. The friction of mind on mind is highly beneficial ; as iron sharpeneth iron, so does the face of a man that of his friend in friendly discussion of their common interests. So, what I have to say this morning is to whet the keen edge of your minds, that you may be able to cut through difficulties easier and more successfully ; and having dispelled many imaginary objections and obstacles, you may see your way to seek, suit and keep for Canadian farm products, the best market or markets in the world—let these be in England or anywhere else. When a man sees well, he can follow his own judgment without danger of stumbling.

But to come to my subject more particularly and concisely : Upon the welfare of the farmers of Canada, depends the prosperity of the Province of Ontario and of this Dominion which we love so well. Everybody says so, and many of them say it with a feeling of generous good nature, that they have paid a compliment to the farmer in thus elevating his calling. The importance of agriculture in Canada is prime, it stands first. It stands first, because all other industries in the country are very sensitive to the condition of the farmer. If he be experiencing hard times, every other industry and interest, suffers and is depressed. When the farmer has good times, every other industry and interest is bounding with prosperity. The farmer's success comes mainly from good crops, and good crops come mainly from good cultivation, good management and good weather. The farmer can control two of these, and in the third we are more bountifully dealt with than most countries in the world, in point of weather favourable for the growing of large crops, of fine quality. Still, I am not to detain you on these aspects of the farmer's business to day, but on the marketing end of his calling. It has been very often my privilege to meet representative gatherings of farmers, to discuss with them some aspect of their own business. It has not required any conscious effort on my part to refrain from discussing the question of markets, near or far off. I have not felt called upon to give utterance to almost a single sentence of direction or advice to the farmer concerning the market end of his business. I have been trying to direct the farmer's attention to the home end of his business, the end where his profits are mainly made. The profits are mostly made within the sphere of the man's business, where he can exercise appreciable jurisdiction and control ; and the market end of a man's business is subject to the influence and is under the control of all the producers, as well as the buyers, in the whole world.

In my humble judgment, public speakers, the press politicians and other leaders and teachers of the people, have directed the attention of the farmers all too often and much too emphatically to the marketing end of their business. That mischievous course has resulted in leaving on the minds of many farmers an impression (and I would like to have a chance of making the only impression on your minds that is to be made just now), leaving on the minds of the farmers an impression that a market, the market, every market, has some sort of personal, self contained existence ; in fact, that a market is to the farmer of Canada what a deity or devil was to the heathen, some external power or existence that could bring happy deliverance or wreak dire destruction at mere caprice. A market has no such power, has no such functions, has no such existence. Some of the farmers have been even further misguided, insofar as they have been led to imagine that the market, a market, any market, can be charmed into sweet serving by the wand of politicians, or can be chased away beyond touching, tasting, handling or seeing, by their edict of hostility. The markets for farm products,—and the moon,—are in some measure, amenable to the edicts of some politicians.

A few observations, here, may be offered in all simplicity and candor, as to how I think the farmers should regard the markets, which ones I think they should seek to suit, and what services they ought to expect from them. I desire to discuss this wholly from an economic standpoint,—not partisan, not political,—because I have neither partisanship nor politics, except for profitable agriculture. A preference for a market, a preference for selling in a market, a preference for buying in a market, may have a sentimental basis as well as a purely economic one. There are men from whom I would

rather buy at the same price than other men; there are men to whom I would rather sell than to other men. Sentiment accounts for a great deal that we do in business and other affairs. A market is merely a name for an exchange of commodities, such as eggs for sugar—a market; butter for groceries—a market; wheat for clothes—a market. Money is used as the medium of exchange, according to certain values mutually agreed upon. Money is a medium for facilitating the transactions of marketing; it does not create a market. Marketing is exchanging things; getting money is another question altogether; marketing is exchanging things always. A market has come to be almost wholly a place for the exchange of products for money. It is unwise to use carelessly the terms "producer," and "consumer." Many men get all kinds of mists around their judgments, because they hold that a farmer is always a producer and a townsman is always a consumer. A farmer is a consumer, and a customer; he is a consumer of binding twine, of cottons, machinery, furniture, and a score of other things. A farmer is as much a consumer as a townsman is. He eats as much, man for man, and works as much, man for man, and lives as well, man for man. And the man who lives in town, if he is honest and earns his living, is as much a producer as a farmer. There is no such thing as honest, intelligent, non-productive labor in the town or the country. I want a suit of clothes, or a collar, or a pound of tea, or a legal opinion, or a pair of shoes, or a sermon, or candies, and somebody must produce and furnish these things for me. I am a consumer as well as a producer, although I live on a farm. A farmer is essentially a food producer; that is his proud title; and when he gives in any form a food product in exchange for money or other commodities, he markets his farm products—essentially and mainly his food products. He has also other things to dispose of, of which he may justly be called a producer, such as horses, wool and wood. Wood is a farmer's product, in the sense of its meaning a commodity increased in value by the farmer's toil and grown on his fields. The market of these things is not different in its nature from the selling of food products. In the market, the farmer needs to meet the customer or consumer, who wants what he has to dispose of, and who is willing and able to give him a good exchange. A customer or consumer, on his part, wants to meet a seller who has what he wishes to procure. If another man has in abundance already of what I have to offer for sale, why should he want what I have to sell, except to resell it at a profit which I would rather obtain by selling direct to the ultimate consumer? A most advantageous quality in the market is, that the customer should be the man who ultimately wants to use the article which he buys, lest in the meantime another party should step in and get part of my profit as producer, and part of his price as consumer, and thus raise the price to him and lessen the price to me. If there be only two individuals, a seller and a buyer, and they cannot agree upon the terms of exchange, no business will be done. If there be two sellers and two buyers, then the one seller's opinion and judgment is not the only factor on the selling side of the problem of price. The other man's competition may make him change his mind; and I want to show you the meaning of that. John Brown takes to town a load of cordwood and says: "I will get $4.50 a cord or I will take it home." John Black is the only man who wants cordwood that day. He says: "I will buy at $4.25 a cord, and if not I will wait until to-morrow." John Brown does not see anybody except John Black, and he takes the cordwood home. When he goes to the market next day, he finds four other men with cordwood there, and four other buyers who want cordwood. John Evans says: "I would rather take $4.40 than take my load home," and, if he sells at $4.40, it weakens the judgment and determination of the other men to hold out for $4.50. It subjugates the individual judgment to the common judgment of the whole of the sellers and buyers. There is some difficulty sometimes in understanding what is called the law of supply and demand. It is nothing more, in my judgment, than the general consensus of opinion of all buyers and sellers as to the relative values at a given time.

You will bear in mind there are threefold competitions in markets: a competition between buyers, which tends to raise prices; a competition between sellers, which tends to lower prices; and there is a third competition which is often forgotten,—that between products for preference in the market. It is not hard for an excellent quality of anything to displace a poor quality at the same price. If we in Canada, in looking at this question

squarely in the face, could induce more competition from buyers, the tendency would be to raise prices. If we in Canada can improve quality, so as to furnish better goods, the tendency will be to displace other products of other countries, get higher prices for our own, and get control of the market. The course for us in our own markets is, to induce competition from buyers, to improve quality, and, as far as possible, here, to avoid competition between producers. Now let me show you again; Tom Brown and John Black have produced fifteen pounds of butter each; the local markets at their village will take ten pounds from each man. Both men have a surplus to send somewhere else. Then, these five pounds of butter from each, meet elsewhere in competition. They are competing again at the other end where these five pounds go. If by any means Tom Brown can provide another market for the five pounds of his own make, or the five pounds of John Black's make, so that it will not meet his in competition, nor displace in the market any other five pounds which can meet his in competition, it will be to the advantage of all producers of butter. If any man who produces can get exclusive control of a market, it will be easier for him to get the highest price which the market will afford. Nations acting in their collective capacity, are to be considered as aggregations of individuals, John Browns and Tom Blacks, and if you will find a principle that will apply successfully to the business of John Brown under given conditions, it will apply successfully to the business of the biggest nation on earth under like conditions. A principle is like a law of the universe, it does not adjust itself to individuals; the individuals and nations that accommodate themselves in conduct to right principles will flourish best. Let me apply a few principles to markets, and I will apply them to nations and measure the wisdom of their actions, according to their conformity to these principles. Nations, like individuals, need customers who want to use as ultimate consumers the surplus of goods which they have to sell. In the market we look for and expect certain things:

1st. Accessibility to customers. I have an aversion to tolls on the way to market. It bothers me when I have to take out my pocket book on cold and wet days to pay them; it is disagreeable as well as expensive. If there was a market at the end of a road with a toll on it, and another market at the end of another road with no toll on it, I would go to the market which was reached without a toll. You can toll anything you like, but it stands between me and my customer, and takes something from me or my customer.

2nd. I want in the market a permanency of adequate demand. Commerce is always shy, she is shy of uncertain markets. Commerce is like girls, very coy and wanting some coaxing always.

3rd. Then, I want a fair chance in competition in the market.

4th. I want discrimination as to the quality of goods. If I think my goods are better than another man's, I will get a better price, so as to encourage me to go on and do that style of business in production.

Accessibility by good roads—railway and steamship lines included—no tolls if you can help it: permanency of adequate demand, so as to avoid the irritation that comes from uncertainty; a fair chance to compete with other goods in the market; discrimination of quality that will induce each seller to go home and do better next time—these are the qualities that you want in the market to which you take or send your products.

The buyer in a market has particular wants, and, if I do not look after them I will be a fool, for it is he whom I want to please with my goods. The requirements of an available market must be studied. If a man went to Ireland to sell badges on the occasion of any public festival, and had the badges all of a red color or a blue color, he would not sell many, even if they were of good material and cheap, but if he had them of green he would sell them freely. He would be required to study the wants of his customers, or the prejudice of his customers, or the preference of his customers, and cater to their tastes. If you do not do that you cannot keep any any market, even after you have obtained it. The market must be studied and suited to be kept. It takes time to get a demand; it pays to study to create a demand, to overcome prejudice, to win a preference, which is always a decided advantage. I went into a shop in Scotland a good many years ago in which Scotch cheddar cheese was retailing at sixteen cents per pound,

and Canadian cheddar cheese was retailing at twelve cents per pound. By all the rules and standards of nourishing qualities, wholesomeness, taste and appearance, the cheddar cheese from Canada was worth four cents more than the other, but the prejudice of the people made them willing to pay four cents a pound more for an inferior quality. We have reversed that now in some measure and have won a preference for our goods. It is a big thing to have a preference in your favor, and it is a bad thing to have a prejudice against you.

Does the English market meet these requirements? The English market is accessible. I shipped fresh made creamery butter from Woodstock, Ont., last week, to Liverpool, for 55 cts. per 100 pounds. It will have cold transit all the way, with no depreciation in quality. Can you send butter from your own place, twenty miles back from the city, to the market for less than half a cent per pound? From Woodstock to Liverpool it costs me 55 cts. per 100 pounds. The market is permanent. There is an adequate demand. England is the largest importer of fruit products in the world. Then there is a fair chance in competition in the English market, and there are not any tolls. John Brown lives in Oxford county. They have tolls in Oxford county. Another man, Tom Black, lives in Middlesex county, where there are no tolls. John Brown takes to market a ten pound basket of butter, and it costs him on the road two cents a pound for tolls. If the butter sells no dearer in Woodstock than in London the Middlesex butter maker would have the better chance to make marketing butter pay--by at least the two cents per pound of toll money. England does not have any tolls on farm products.

Then there is discrimination of the keenest, sharpest kind. The English market will pay to-day for cheese from three cents up to seventeen cents a pound wholesale.—Discrimination! It will pay for butter from six cents to thirty-one cents.—Discrimination! That is the kind of a market I want. I do not want a market where everybody gets the same price, whether the quality be excellent or poor. The treatment tends to discourage the efforts of the people toward improvement in quality, which alone can give permanent success. Then there is the competition between buyers of the keenest kind. Napoleon a good while ago said, England was "a nation of shop-keepers." If you have a nation of shop-keepers, they, for the sake of profit, will compete, and the competition will always push things to the very verge of maximum price. England has been called a nation of shop-keepers; she is a nation of shop-keepers and food consumers—shop-keepers to compete for, and food consumers to use what we have to sell. We are a nation of farmers, a nation of food producers. We have food to sell; they want food to buy; they have a good, ready, permanent demand, competition and fair play; I want to go there if they will treat me in that way.

The possible profit from production does not all reside in the market price. The enlarged and improved carrying facilities of the world have made competitors out of men who are far removed from each other in geographical location. At Woodstock, Ont., in the production of butter, I am a competitor of a man who is on the other side of the earth, in New Zealand. It was not always so. I can take you back to a little shop in Scotland where we used to sell butter made on the farm; a few other farmers were then our only competitors. But you can go there now and buy American and New Zealand butter, and the New Zealand dairyman meets me there and has become my competitor. It is not of my will that it is thus, nor only of his will. It is the progress of civilization and the progress of humanity that have made competitors out of producers all over the world; and we cannot help ourselves. Since I cannot control the market price of my products, my profit at that end is an uncertain quantity. Profit always comes between the price obtainable and the cost of production. If it costs me here fifteen cents per pound, and I can sell there for twenty cents per pound, I have five cents of a margin for profit. If I can reduce this fifteen cents of cost by the application of good business methods to ten cents, I lengthen my line of profit at the safe end of the business, where nobody comes in to interfere and prevent me from getting it. Therefore, the main profit is made at the home end of a man's business, which he can control. The home end of a man's business in every sense, is the one which he should look after most.

The food products from the farms in Canada are mainly eaten at home in our own country. I want to show you the gain in market capability, market capacity, in Canada

in ten years The growth of population who eat food, but who do not produce food, in ten years has been 384,146. That is the increase in the population in cities, towns and villages of over 1,500 souls each. These people consume the farm products of Canadian farmers, at wholesale farm prices, to the amount of $21,000,000 annually. We send to England and the United States now, of the same things—farm products—leaving out horses and hay, to the value of $35,955,986, annually. Our whole export from Canada last year, ending June 30, 1891, to Great Britain and the United States, in farm products (except horses and hay) amounted to that sum. The total export to the United States of the same things in the same time, reached the value of $10,017,390. The extra people that have come into the towns of Canada in ten years, buy from Canadian farmers twice as many dollars worth of their farm products annually, as we send to the whole of the United States. That means a good deal. I do not like anybody that tries to create a feeling of antagonism between the townsman and the countryman. The townsman is a customer of the countryman, and the countryman is a customer of the townsman, and there should be no antagonism. If their interests are not identical, they are, at least, harmonious. All efforts to create distrust and dislike between the agricultural and manufacturing interests should be refrained from. As the town grows, the country makes some progress; they mutually benefit each other.

Suffer a few words as to the kind of farm products, which we can sell anywhere, with advantage to ourselves as farmers. We have in Canada only so much of certain valuable elements in the soil, and when we sell off any farm products, we sell off some of these things. The constituents in the soil which are essential to plant growth, and which in many places are becoming scarce, are nitrogen, phosphoric acid and potash. If a man sells a large quantity of these things for a small price, he impoverishes his farm.

Nitrogen, phosphoric acid and potash, in one ton each, of some farm products:

	Nitrogen.	Phosphoric acid.	Potash.
	lb.	lb.	lb.
Wheat	41.6	15.8	10.4
Barley	32	15.4	9
Oats	38.4	12.4	8.8
Peas	70.6	17.2	19.6
Beans	81.6	23.8	26.2
Indian corn	32	11.8	7.4
Hay	31	8.2	26.4
Clover	39.4	11.2	36.8
Potatoes	6.8	3.2	11.4
Fat cattle, alive	50	31.2	2.8
Fat sheep, alive	44	22.6	2.8
Fat swine, alive	34.8	14.6	2
Cheese	90	23	5
Milk	10.2	3.4	3
Fine butter	.5	0	0

In every ton of barley the farmer sells thirty-two pounds of nitrogen, fifteen and one-half of phosphoric acid and nine of potash. If a man will persist in selling a ton of hay and a ton of oats—the two tons for $30—he will sell as much of the elements of fertility off his farm as he will dispose of in two tons of fat swine for $200. If he sells fat beef he will sell about one half more for $200 than he sells in the other case of primitive products for $30. If he sells cheese, he will get for the cheese $200 a ton, and sell less in one ton than in two and one-half tons of hay for $25. If a man will sell a ton of hay for $10, he will sell about sixty-five time more out of his farm for that sum than he will for $500 in butter at 25 cts. per pound. Cheese is more exhaustive. Fine butter is nearly all carbon, but strong butter has some nitrogen in its ammonia; strength acquired in that way has not any money value.

I will read to you for a moment the judgment of the Department of Agriculture of the United States of America on this question, from an official publication in December, a year ago, as prepared by the Hon. J. A. Dodge, Official Statistician of the Department

of Agriculture, at Washington, and since issued under the authority of the Hon. Mr. Rusk, Secretary of Agriculture:

"Competition in production leads to excess or surplus, which tends to reduction of price. Competition can be stimulated to strengthen demand, both in domestic and foreign trade. The former is the wider field, because occupied exclusively; the latter is a supplementary resource of great importance. We possess the markets of this country and propose to keep them; we may share, while we cannot monopolise, foreign markets, at least so far as to supply deficiencies in foreign production. At your request, I will assume the task of indicating the extent of foreign wants, and the means by which a larger demand for dairy products may be enjoyed."

"In seeking a wider movement of these products towards the markets of the world, I would not for a moment encourage the delusion that the exportation of the crude and bulky products of agriculture can be indefinitely extended or made profitable in foreign trade. That idea is held and promulgated either in ignorance or for a partisan purpose. The hay and forage from nearly 200,000,000 acres, representing great values, we could not export if we would, and should not if we could. Vegetables in their crude form, are ineligible for exportation. When corn is worth but $8 a ton, it is folly to pay for transportation four or five thousand miles, in preference to shipping it in beef, worth $180 per ton, in cheese at $200, or butter at $280. Our agricultural exports are practically confined to cotton and tobacco, to meat, bread-stuffs and dairy products. The cotton is worth as much as cheese, or $200 per ton. Tobacco averages $180 per ton. Wheat, with a value in the garner of only $30 per ton is not worth shipping to meet the competition of the rudest and lowest agriculture of the world, and its exportations will gradually decline. It is only sustained now by the exigencies of a primitive and slovenly system of agriculture."

"It is not merely the cost of transportation, which railway development has cheapened extraordinarily, that should bar this foreign movement of primitive products, but the reckless waste of plant food, tending to rapid sterilisation of the soil, and consequent reduction of its rate of yield. We are learning slowly the avoidance of this waste; in cotton, by making oil of the seed and feeding the oil cake, exporting only the fibre, which contains little that is exhausting to fertility; in wheat, by milling and retaining the bran and shorts for the use of the dairyman and other feeders; in corn, by transformation into pork, and returning to the soil a large proportion of its elements; in milk, by sending only cream to butter factories, and retaining nearly all that proves exhaustive. We cannot afford to export, or waste otherwise, the fertility garnered in a thousand years of growth and decay of vegetation. It is the capital of the farm that should be held as a sacred heritage for the use of the future generations, and not squandered prodigally, but increased by every means offered by scientific agriculture, both for prospective personal profit and the prosperity of our descendants. Such recklessness is the suicide of thrift and the annihilation of the birthright of posterity."

"The lessons to be learned, therefore, relative to the extension of foreign trade, are two, viz: That the expense of transportation should be minimised by the selection of products of high value in proportion to weight, and the loss of fertility should be avoided by the exportation of carbon, rather than nitrogen and phosphoric acid. This course not only conserves fertility, but simplifies the transportation problem."

I will speak a little while on the possibility of getting a profit in the English market from selling animals and their products. Let me tell you what quantities have been imported by Great Britain, which will show the extent of the market for these things during the past year. The exports of animals and their products to Great Britain from Canada in 1880, amounted to $11,104,223. In 1890, these had risen to $18,578,722, and last year to June 30th, 1891, they had risen to $19,840,492. In eleven years, we have gained in sending these things to the English market from eleven millions of dollars to nearly twenty millions of dollars in a year. That shows where our food products in the form of animals and their products are going. We sent to the United States during the same period, of the same things, in 1880, to the value of $6,016,988. In 1890, these had fallen to $5,966,474, and last year, we sent only $3,148,463 worth. That shows a decrease in the exportation of these things to the United States, and an increase in the selling of these things in the English market. For why? Do you think that the people of the United States, are blind to the teachings of their own leaders. They are seeking a foreign market themselves for the same things, and they are meeting us on the English markets with them, therefore, they do not need ours. They do not want ours, unless to get them and make a profit from the handling. Great Britain recognises the advantage of producing on her own farms more animals and their products, and in the last two years they have increased the cattle which they have by 11.6 per cent., the sheep and lambs by 12.1 per cent., and the swine by 15.1 per cent.

Cattle. The imports of cattle from Canada last year, ending December, 1891, into Great Britain, were 108,289, and the value was $8,623,202. The oxen, bulls and cows averaged $81.40 each at the landing ports. Freight, including landing charges, cost about $28 per head. If the farmers of Canada cannot make a profit in fattening steers and selling them at $53.40 on the average each, they have only one alternative. They

cannot lift that market, it is a market of 507,407 cattle, imported at a value of $41,673,659. If they have not made a profit selling at $53, they can do so now by reducing the cost.

Then we have an advantage in selling cattle to the English market, in that our cattle can go alive to all the inland towns of Great Britain, and that is worth from $2.50 to $5 a head to us, above all other competitors who are barred from doing that. We can send at an increased profit by improving the quality of the animals. We do not want these great, long, thin, tall animals that some men want to breed all the while. In the English market, you will get about 20 per cent more per pound for the low set, compact animals. The possible profit might be greater if we would export dressed beef instead of live cattle, in many cases. I have been mildly abused and opposed for recommending the establishment of large slaughter houses in Canada. But you do not send to England live animals, without having them reach Liverpool bruised and jaded, fevered in condition and lighter in weight, while dressed beef in a cold storage compartment does not deteriorate. At present, the retail butchers in England are opposed to any change that will prevent them from realising the larger profit which they make from sales of meat from fresh killed animals. We will be able to overcome that hostility, and after a time, put our beef and mutton on the English market in the most economical way. We should seek to develop the trade in fattened beef, and not in lean steers. I will read you an extract : "When we ship over to Great Britain store cattle, we ship cattle that should have been fed in our own stables, and that should have produced for ourselves the profit which the Englishman produces for himself by buying the animal and feeding it in Great Britain." That is from the address of your President last year.

Beef. The total value of beef imported into Great Britain in 1891, was $21,386,610. In the year ending June 30th, 1891, Canada sent only $740 worth.

Sheep and Lambs. The total number of sheep and lambs imported into Great Britain in 1891 was 344,504 Canada sent in the year ending June 30th, 1891, to the number of 40,732. Some experiments in this shipment of lambs to the English market were made and reported upon by Professor Shaw whose excellent reputation is known throughout all Ontario. He states as his conclusion, that a profitable trade in the shipment of lambs of good quality can be developed with England. With many others, I have been curiously amused at the criticisms of some who belittled Professor Shaw's earnest effort to hasten the agricultural millenium—the time when the British Lion and the Canadian Lamb will lie down together in peace.

Mutton. The total value of mutton, imported into Great Britain in 1891, was $15,972,404. Canada sent $8,066 worth, in the year ending June 30th, 1891.

Swine Products. The total value of bacon, hams and pork imported into Great Britain in 1891, was $48,868,234. The total value sent from Canada in the year ending June, 1891, was 7,530,079 pounds, with a value of $626,037. Denmark with a population of about 65,000 greater than Ontario, sent over 52,000,000 lb. for which she realised an average of 12 cents a pound. We realised about eight and a quarter cents; and the bacon from the United States was entered at an average of about 7 cents per pound. The Danes have learned to cater for their customers, and have not believed in trying to sell lard to a man who wants to eat lean pork. So it will pay us to get leaner and less lardy hogs. The quality that is wanted is lean pork from dairy fed swine. To meet the requirements of the English markets, larger numbers of our swine should be sold by our farmers alive. They could then be slaughtered at packing houses, where the carcasses could be treated and cured in a uniform, satisfactory manner. As a rule it pays the farmer and feeder better to sell his swine on foot, than to market them as dressed hogs. Canada competes in the English market with the United States, which sent to England the largest proportion of the bacon she imports. That realised 7 cents per pound, and our bacon will sell from a cent to a cent and a quarter higher, because our pigs are fed on the by-products of the dairy and mixed cereals, while theirs are fed chiefly on corn. We can increase the profit by reducing the cost, through economical fattening and selling the animals before they are too large and old. In the course of feeding experiments at the Experimental Farm, Ottawa, six pens of pigs were fed for over five months. The experi-

ments at the Farm at Ottawa show that four and one-half pounds of grain will give one pound of increase in live weight of swine, and that it is not profitable to fatten swine for any market, after the weight of the animal exceeds 200 pounds alive. In some feeding tests, during the first month of feeding, when the pigs weighed from 77 to 103 pounds each, only 3.31 pounds of grain were required for each pound of increase in weight. During the next month, 3.07 pounds of grain were consumed for every pound of increase in live weight. During the third month, 31. per cent. more grain was consumed for every pound of gain ; 86 per cent., 110 per cent. and 125 per cent. more grain was consumed for each pound of gain during the next three months respectively. At the end of the test the pigs weighed an average of 231 pounds each. For the last month's feeding, 6.93 pounds of grain were consumed for every pound of increase in live weight. By winter dairying you will find it possible to increase the supply of hogs, as well as to produce them cheaper. I do not know any way of raising small pigs successfully and economically, except by the use of skim milk after they are weaned. The winter raising of young pigs, to be fed off and sold during June, July, August and September, should be a very profitable adjunct to winter dairying. The English market will take an unlimited quantity of well-fed lean bacon and hams.

Cheese. The total value imported into Great Britain in the year ending December, 1891, was $23,434,829. Canada sent of that $9,692,438, and the United States sent $8,660,817. In 1881 we sent to Great Britain cheese to the value of $5,510,443, and now it is nearly $10,000,000 a year. Ten years ago (1881) the United States sent cheese to the value of $16,380,248, and last year (1891) $8,660,817. We are gaining on our competitors by sending to England the kind of goods for which they have a preference ; and, if we will do the same with other articles, we will win an equal preference and advantage. In this commodity also it is possible to increase the profits by reducing the cost of production. The Hon. Thomas Ballantyne said very lately, in my hearing, that he had one cow that gave last year over 12,000 pounds of milk, and another one which yielded 11,000 pounds. By enlarging the capacity of our cows, lessening the cost of their feed by the use of corn ensilage, and improving the quality of our cheese, the profits may be greatly augmented, The English Cheddar cheese retails in England in some cases, for eight cents a pound above Canadian Cheddar cheese, and the latter occasionally sells for eight cents a pound more under the name of English Cheddar. I want "Canadian Cheese" marked on the cheese as well as on the box. We are making an effort, by branding our cheese "Finest Canadian," to gain for our farmers the higher price, which at present finds a stopping place in the pocket of the crafty English shopkeeper. The shipment of cheese trom the Dominion Experimental Dairy Stations is having the effect of still further advertising the fine quality of our cheese. The trade with England might be doubled, as doubtless it will be in a few years, when the maritime provinces have their dairying developed. In Prince Edward Island, which is admirably adapted for dairying, the farmers thought that it would not pay, and that fodder corn would not grow. Last year from the meetings which I addressed in the maritime provinces, I sent out 524 samples of corn, to plant nearly a quarter of an acre each, and you never before heard of such glowing reports as I have been receiving since. In England, we have had to meet with competition from inferior goods from foreign and our own markets. Three years ago cheese from Quebec sold for an average of about one and a half cents per pound less than Ontario cheese, and last year less than one half cent per pound lower than Ontario cheese. Quebec is going ahead at a faster rate than Ontario, and will soon outstrip you in cheese and butter in the English market, unless you mend your ways. In Quebec it is estimated they have nearly 3,000 silos, and you have not nearly so many in Ontario.

Condensed Milk. In the matter of milk, we might send to England a great quantity of condensed milk. England imported in the year ending December, 1891, $4,124,745. We have only one condensed milk factory in Canada, and the quality of the product manufactured there is most excellent.

Butter. In the matter of butter, Great Britain imported during the year ending December, 1891, butter to the value of $56,410,414. Of that quantity, Denmark sent $23,680,421 ; France, $14,785,239, and Canada $912,307. Why did we send so little ?

Because we have not learned the art of making butter in the cheapest way, of the best quality, and at the most favorable season of the year. Denmark makes the largest share of her butter from September to March. The average price realised by the Danes was 24 cents, and by Canada 18½ cents per pound. We have sent lately a shipment of 186 packages from the Experimental Dairy Stations at Woodstock and Mount Elgin, which I think will sell as high as the finest Danish butter. We have been running a creamery at Woodstock on the cream gathering plan. The farmers set the cream on their own premises, raise the cream and furnish that. We have also one at Mount Elgin, where we take in all the milk, and use a centrifugal cream separator. By the use of a centrifugal cream separator we can get from fifteen to thirty per cent. more butter from the same quantity of milk, when the cows have been calved more than six months. It means that there is the possibility of a very much greater profit when all the cream is taken out by the centrifugal machine. The English price for fresh-made, fine butter is always high during the winter. A responsible firm of exporters of dairy products has offered to provide one half the amount required to alter twenty-five cheese factories into creameries for the manufacture of butter during the winter. By the use of a centrifugal cream separator at a creamery, from fifteen to thirty per cent more butter can be obtained from the same milk than when it is handled in the ordinary way at the farms. A higher price can always be obtained for quality that is uniform. The winter creameries will enable us to ship $1,000,000 worth of fresh-made creamery butter to England annually, during the winter, within three years; and these 186 tubs from the Experimental Stations are the first which have ever been sent.

Poultry. The value of poultry imported into Great Britain, in an average of the three years, 1888, 1889, 1890, was $2,229,885 annually. The average from Canada during those three years was $1,500. Is it possible to sell poultry at a profit in the English market? Smith Falls has the largest poultry market in Canada, before Christmas time. The price last year of turkeys there, in December, was from seven to twelve cents per pound; and price at Liverpool for turkeys dressed, was twenty-one to twenty-six cents per pound. The freight to Liverpool is from one and a quarter to one and a half cents per pound. Mr. Dawson, of Brampton, has made his fourteenth annual shipment, and they have arrived in good condition and sold at a profitable price. I have a letter from Messrs. Thomas Bothwick Co., who are said to be one of the largest dealers in this particular line of product in Liverpool:

"We beg to inform you that the large consignment of Canadian turkeys received by us at Christmas, and which were packed strictly in accordance with the instructions you sent out to the shippers, arrived in good order, and met with a ready sale at what must have been remmerative prices to them. We beg to point out that, if turkeys of good quality, and shipped according to your directions, should arrive at the proper time next season, there is practically an unlimited demand for them, as we have introduced them, not only into Liverpool, but to all the large towns with which our business is connected, viz., Manchester, Birmingham, Sheffield, Oldham, Rochdale, Leeds, Leicester, Wolverhampton, Hull, Bradford, Cardiff, Bristol, Glasgow, Edinburgh, and other large centres of population in Yorkshire, where they have met with great favor. With careful feeding, packing and forwarding by fast steamers, they would be a formidable rival to turkeys from the continent and, indeed, be a formidable rival to the home article. We cannot help thinking, after the experience gained in dealing with Canadian turkeys, during the last two years that, properly handled, a large development of this trade may be confidently looked forward to."

Eggs. There were imported into Great Britain in 1891, 106,811,370 dozens. Canada has been exporting about 12,839,000 dozens annually. Up to the past year we have sent to England annually an average of only 1,849 dozens. We used to send lots of eggs to the States, and they wanted them, but now they want something else besides them, and that is a big toll. Last year, we sent to Great Britain just because we were compelled.

A Voice.—"Yes, because we were compelled."

Prof. Robertson.—You know a man's salvation often dates from the time when he was compelled to consider his circumstances and adjust himself to new conditions. We sent to Great Britain, last year, 2,269,757 dozens. The Government agent at Liverpool, Mr. John Dyke, writes as follows:

"The best quality of Canadian eggs compare very favorably with those from the continent, except as regards those known as "best French." These come principally from a small district in Normandy, are specially selected and are shipped without delay. This supply, however, is very limited, and does not affect the general trade."

"Danish, Austrian, German, French and Irish are not so good in point of size as Canadian. The best

Austrian and German weigh about 14 lb. per 120, Danish 14 to 15 lb., best Canadian 15 to 16 lb., with specially selected as much as 17 lb. per 120. Price at the time, German and Austrian, were making 8s., 8s. 2d.; Canadians were making 8s. 6d., and they have ranged from that to 10s. 6d. per 120."

"Freights on German and Austrian are 5d. per 120, from Hamburg, and they may be set down as 1s. from the principal points in the interior of Europe from which they come. From Canada, on the other hand, the rate is only 6d. per 120, from points as far west as Port Perry, Ontario, and from Prince Edward Island, and this is actually 1d. to 1½d. per 120 cheaper than it costs to get eggs to Liverpool from the west of Ireland."

"When in long cases, they should be packed in long, clean, dry straw, rye for preference. When sent in patent packing, the cardboard boxes should *not* be filled in with oat hulls or chopped straw. There should be no necessity for it. Oat hull or chopped straw packing should not be used at all. It is objectionable as, in the case of the breaking of one egg, this packing holds together the three or four surrounding eggs and spoil their appearance. Eggs should be shipped as fresh as possible, and the more rapid the transit the better."

"Import of eggs into Great Britain from the continent: 1889, 94,166,390 dozens; 1890, 102,912,460 dozens; 1891, 106,811,370 dozens."

There is a fair prospect for a large and remunerative trade with England, when experience has enabled shippers to avoid losses from breakages, and has induced the steamship companies to provide refrigerator space at low rates.

Recapitulation. The total value of these animals and their products which I have enumerated, which were imported into Great Britain in 1891, was $240,864,671. In the year ending June 30th, 1891, we exported of these products to Great Britain to the value of $19,684,238, that is practically eight and one-sixth per cent. of the total value of these things which she bought from abroad. We sent to great Britain and the United States during that year, altogether, $21,617,679 worth of these products. We really sent to England of these things that I have enumerated, beginning with cattle and ending with eggs, food products from the farms to the value of $19,684,238. And we sent of the same products to the United States to the valve of $1,933,441. I am confident we can extend this trade until we send to England thirty per cent. of all the food products she buys. We have the area, the cattle, the climate, the carrying conveniences, and all we need is more men. The men we have now do fairly well but they might do better; and if we do everything we can, we can capture a larger share of this market and get one-third of it. In area we are the third largest country in the world, and our magnificent plains in the west are filling up.

Horses. Great Britain imported in the last three years, 1888, 1889, and 1890, an average of 14,874 horses annually, of which Canada sent 179 a year. The horse market is dull in Canada. Horses in England and the United States are just as much cheaper than they were, as they are here. In Ottawa the Electric Street Railway Company furnish a most excellent service on the streets with electricity as the motive power. Toronto is discussing the feasibility of having electric street cars. It has been stated by writers of good repute, that the substitution of electricity for horses, lessened the demand by 25,000 on this continent alone, during last year. If the demand has been lessened, and is being lessened, there appear to be only two remedies, either to produce less, or to produce the kind that is now wanted. The horse that is mainly wanted in England is of a lighter style than we have been breeding. They are in demand for cavalry re-mounts; the average price there is £30 to £40. It costs abont $45 each to ship them there.

Canadian Grain Products. It is contrary to my own preference to advise the farmer to sell any primitive grain product off his farm, but some men will have a surplus, and as we will have a surplus as a nation, let us see if there is a possible market in England at a profit. Great Britain is the centre where competition meets us from the whole world.

Wheat. The wheat crops of the twenty-two main wheat producing countries in the world, in 1891, were estimated to be 2,029,302,000 bushels. The following are the particulars:

Yield of wheat in different countries in the world, for season of 1891.

	Bush.		Bush.
England	70,125,000	Italy	100,375,000
France	226,875,000	Netherlands	41,250,000
Germany	85,250,000	Switzerland	8,250,000

	bush.		bush.
Belgium	15,125,000	Roumania	45,375,000
Denmark	1,787,000	Bulgaria and Eastern Roumania	34,375,000
Sweden and Norway	4,675,000	United States	525,250,000
Spain	74,250,000	Canada	60,500,000
Portugal	7,975,000	Algiers, Tunis and Egypt	66,000,000
Austria	39,875,000	East India	269,990,000
Russia	182,875,000	Australia	31,625,000
Hungary	116,875,000	Turkey	20,625,000
		Total	2,029,302,000

Some of the information I have gotten from reports of the publications of the Board of Trade, Vienna. Of the countries, which require an additional quantity for home use, England takes 148,000,000 bushels, and France 82,000,000 bushels. These are the only two countries that buy a quantity of wheat with which we have any direct trade relationships. The United States yield last year was estimated in Vienna at 525,000,000 bushels, and they will have available for export about 165,000,000 bushels. Another estimate has been issued by Henry Clews & Co., of New York, the well known crop authorities. Their figures are:

—	Estimated production.	Required for home consumption.	Available for export.
Wheat	600,000,000 bush.	360,000,000 bush.	240,000,000 bush.
Corn	2,065,516,000 "	1,700,000,000 "	365,000,000 "
Oats	758,559,000 "	600,000,000 "	158,559,000 "
Rye	36,000,000 "	22,000,000 "	14,000,000 "
Barley	77,400,000 "	67,000,000 "	10,400,000 "

Last year Great Britain imported wheat to the value of $143,314,592. She imported wheat, meal and flour to the value of $49,566,450, and perhaps she will go on importing still more as her population becomes more dense. Of wheat and flour, Canada exported to Great Britain, during the year ending June 30th, 1891, to the value of $1,821,046. It has been reported that during the four years from 1871 to 1875, the increase in the area of land in the United States occupied for cultivation was 32 per cent From 1875 to 1880, the increase was 34 per cent. From 1880 to 1885, it was 19 per cent. During the last 5 years, 1885 to 1890, the increase had been only 7 per cent., or an increase of one and three-fourths per cent. per annum. That means they have reached almost the topmost limit of their expansion, and they are expanding slowly in the area which they cultivate. We are only beginning to extend our area of cultivation; and the inexhaustible agricultural riches of the North-west have only been touched. I think we will be able to export our millions of bushels of grain and millions of dollars worth of animal products from that part of our country. That will bring re-payment of the big investments we have been making in its behalf.

Barley. In the matter of barley, Great Britain imported in 1891, 34,931,396 bushels, having a value of $28,916,920. Canada has been sending to England very little barley. During the past season, a little over 300,000 bushels of two-rowed barley were shipped, and the price paid to the farmers here has been from 8 to 15 cents higher than for six rowed barley. It has not met with the same favor in England as, perhaps, some of us expected, for this reason, that the English market in everything is a discriminating market. Farmers need to have the different qualities, graded properly, cleaned properly and kept separate, so that everything will stand on its own merits and quality. The Russian Government has been moving vigorously to establish a system of grain inspection at its ports, for Russian wheat has been dumped into England indiscrimnately, and consequently brought the lowest prices. The prices in England for barley have been ruling at 36 and 40 shillings per quarter. That means a price of 92½ cents for our weight of 48 lbs. to the bushel. The freight and charges from Toronto to Great Britain vary from 25 to 27½ cents per bushel. If we had a quantity of barley as good as the samples which

were sent, it could have been sold in England at 36 shillings a quarter. The expense of getting it there would not be over 27 cents a bushel; that makes it possible for the Canadian farmer to realise 65 cents per bushel of 48 pounds. If you want to gain the English market, you must suit it, and it will give you fair play.

Oats. Oats have been imported into Great Britain in 1891 to the value of $26,648,572. The Liverpool price has been from 50 to 55 cents, and the Toronto price about 34 cents, leaving a bare margin of profitable export.

Peas. Peas were imported into Great Britain in 1891 to the value of $4,197,144. During the year ending June 30th, 1891, Canada sent to England peas to the value of $1,485,348. They have been selling in Liverpool at about 90 cents, and in Toronto at about 60 cents. Other varieties, like the Prussian Blue and Marrowfat will sell at a higher price per bushel.

Apples. I have here the particulars of prices obtained for Canadian "Baldwins" in the Liverpool market, during the present season. Based on sound No. 1 stock, the average price was 16s. 4d. a barrel or about $4. The average transportation charges are from 90 cents to $1.10 per barrel. I have a chart here, showing the relative position for four years of the Cananian apples, showing how the Canadian Baldwins compare with New York, Maine and Boston Baldwins. The chart shows that the Canadian Baldwins have been getting the highest prices going. That means that we have obtained the preference of the English purchaser, which I think a very important matter. Mr. John Dyke, Canadian Government Agent at Liverpool, writes as follows :—

"The Canadian barrels are somewhat larger than those from the United States, but the quality of the Canadian fruit stands superior to any other apple imported into England. The particular varieties received from Canada are, Baldwins, Greenings, Northern Spy, Kings and Russets.

Baldwins are the apples in greatest demand, and the lowest average price for No. 1, sound stock, this season, has been 14s. 6d., whilst the highest average has been 20s. per barrel. Later in the season, Russets arrive here, and, being a keeping apple it has the entire control of the market. Kings realise very good prices, but the quantities received are small. It is difficult to make a comparison between one season and another, as the crop varies very considerably. It is rarely that two big crops come in successive years, so that to compare the prices of this with last year is scarcely fair; but, as will be seen from the prices quoted high rates are being obtained, nothwithstanding the quantity received, and there is no doubt that the results have been very remunerative to shippers. The imports this seasons have been in excess of anything before recorded, but the quality has been excellent, and there is practically no limit to the demand for Canadian fruit of this quality and condition.

The English apple, generally speaking, is not of a keeping quality, and is mostly disposed of by the time the Canadian winter stock arrives here, say the middle of October. After that date, the English fruit is not a factor in the competition at all. The freight from any part of Ontario to Liverpool will not average more than $1 per barrel."

I have taken a good deal of your time. The subject as to the possibility of selling Canadian farm products at a profit in the English market, has not been presented as concisely to you as it would have been if I had had more time for preparation; but I have to thank you for your kind indulgence. The object has been to whet your perceptions, clear away some mists that gather around men's opinions when their information is imperfect, and lead you to the formation of a sound judgment and profitable practice. I have touched upon the economical aspects only. Besides, there is the patriotic and national aspect, which means a good deal to most men. I have hope for and faith in the future of my own country, and I have confidence in the capabilities of my own business of farming to render the farmers every desirable service. I am confident that the English market is able to give us such prices for our products as so leave a living profit, a leisure for workers, and enough of a balance to make Canadians the most prosperous, contented and happy people who follow farming, anywhere on the earth.

WEDNESDAY AFTERNOON SESSION.

Prof. Robertson answered numerous questions which were asked by members from the floor of the hall; they chiefly related to the details of butter-making and butter-making machinery. He offered to send dairy bulletins on these subjects to all who applied to him at Ottawa.

THE CANADIAN EGG TRADE.

Mr. D. D. Wilson, of Seaforth, then addressed the meeting in relation to the egg trade. He said: I am taken at a very serious disadvantage in discussing this matter before you to-day, not coming here with the intention of taking any part in the discussion. I have no knowledge of what Prof. Robertson has said here, and possibly, under the circumstances, it may be just as well for me to confine myself to a very few points with which I am fairly familiar, namely, the handling and shipping of eggs to England. I have been trying the English market ever since we were threatened with the McKinley Bill. Before that Bill was passed I tried an experimental shipment about a year and a half ago to see what could be done, and it was rather disappointing. When I compared the results of sales in England with what I was realising in New York at that time I was just four cents a dozen short of what I made in New York. There is another thing to be taken into consideration and that is that we send our eggs to New York large, medium and small, but in the shipment to England we selected the small ones out of that and sent them to New York. My experience since has tallied very much with that, that the small eggs, that we would have a large proportion of, are unsaleable at anything like a fair price to the farmer. In shipments I made this past season I only netted for the small eggs about seven cents a dozen. If we could get them all large we would pay a good price for and ship them to England and make a profit. Large eggs will weigh about $1\frac{3}{4}$ pounds per dozen. We have bought at a common price, the small and large eggs together, which I think is an injustice to the producer and seller, and my proposition is, in future we should buy eggs by weight. Of course no man can make a radical change of that kind alone; he has to have the assistance of the community in which he is dealing. I handled about one and a half millions last year and found the proportions as follows: Those weighing $1\frac{3}{4}$ pounds, about 10 per cent.; those weighing $1\frac{1}{2}$ pounds, 55 per cent.; and those weighing $1\frac{1}{4}$ pounds, 35 per cent. of the whole. You can easily see if we cannot ship small eggs to England and make a profit on them we have to do something else. We have been selling the small eggs in the places where we could get the most money for them, and that is in Montreal, Toronto and other local cities; the large and medium sized eggs we have been shipping to England. I have spent a good deal of time in England in regard to the matter, and have tried to ship the eggs in such condition as was required by the purchaser. If we are going to supply a community with an article we have to put it up in the way that they want it. We get them over there in spring and autumn in fair condition, but not so in hot weather. Some have lost very heavily. One shipment netted us about seven cents and cost about thirteen. The English market is far away from us, and it requires a considerable length of time to get them there. I know a man in New York State who markets his eggs every day and he receives nine cents a dozen above the market price. An egg over a week old is not as good as it is when it drops from the hen, and an egg over a month old is very much deteriorated in quality, even in cold weather. In four or five weeks in hot weather a great many of them would be spoiled altogether. We did everything we possibly could in the hot weather by using refrigerators, fitting up the steamers with refrigerators, but we did not get them there in good condition. I have yet to find an ocean steamship company who will fit up refrigerators and charge so much space for them. When you ask them they simply say: We will give you so much space and fit it up as you like, and every time that steamer comes in you must pay for that

space. We fitted up several steamers in that way this summer, and in every case when we did not have the stuff to fill the space we had to pay for it.

As long as the tariff wall stands I have come to the conclusion that we have to make up our minds to take less money for the product of the hen than we have been hitherto getting, because the English market is not as uniform in price, is not so steady, and so much farther away that we cannot get the article into the market as fresh as they can from the countries close to them. The eggs from France come in in a fresher condition than we can possibly get our eggs into that market, and they get a better price for them. In dealing with the English people, if we have a first-class article in first-class condition there is no nation on the face of the globe who are willing to pay more for it, but the moment you come below that first-class article you have to take very much less in price, and anybody looking at the whole circumstances can easily see that it is impossible for us to place our eggs on the English market in as good condition as they can be placed there from Ireland and France. So that that market is not as profitable for us as the United States before the McKinley tariff came into force. Since that all we have to do is to make the most of the English market as long as that barrier stands between us and the United States, but it will not pay us to give the prices we have been giving in the past. I have had twenty-seven years experience of shipping eggs. An English buyer said to me two years ago that they must have them in long straw, but in my experience straw, even though kiln dried, is a quicker absorber of moisture in crossing the Atlantic Ocean and it will heat the eggs. I use oat shells from the oatmeal mill.

There is great difficulty in overcoming the prejudice of the London commission merchant. I was introduced to one of the largest shippers in London and asked him if he would not try a package of Canadian eggs, and all the answer I got was a shake of the head. I said, "Will you come and look at them?" He said "No." I then said I will send you a couple of cases, and you can test them in any shape and make your own price for these two cases. He said "No. I don't want them, and probably if I get them into my warehouse I will have to cart them out as manure." At the present time I do not think there have been any eggs gone into the London market, or very few, that have made any money.

If we could get hold of these London people and they get something that they liked and in the condition they wanted it, then an outsider would have the same trouble that we have in getting in there now.

The price of eggs most peculiarly goes up and down something like finances run. I have kept a record of it for twenty-seven years, and the prices run in about eleven year cycles. The lowest prices realised were in 1867, 1878 and 1889. In 1878 and 1889 the average price was a little over ten cents a dozen. In 1891 the price in New York was high, partially due to the McKinley tariff. Previous to the McKinley tariff the Ontario dealers paid half a cent a dozen above our neighbors in Michigan. Last year under the change of circumstances the difference was fully four cents in favor of the Michigan people. The egg dealers in Canada have not have not had the profits they have had in the past. A number of them have had not only no profits but serious losses handling eggs during the present year in the English market. I am of the opinion that the English market will never be equal to the United States market with the McKinley tariff or without any duty. I believe it would be to our interest as Canadians to take down our tariff wall and allow the goods of the mother country to come in free as she admits our goods. (Applause). I would rather pay a direct tax than be paying treble prices. The tax is paid three times over in an indirect way.

Mr. Beam, in speaking of the advantages the farmers in the county he represented had derived from being able to trade in Buffalo, said that these advantages had been withdrawn by the imposition of the McKinley tariff. He was informed by a Canadian living on the American side near Buffalo that he paid $45 an acre rental for land used as a market garden. Even at that figure he could make money on it, while similar land in Ontario would rent for about $1.50 an acre. Since the farmers of Canada were so effectually shut out of the American market he advocated making the most of the English market, though from its distance it must be much more inconvenient.

W. H. Thompson agreed with Mr. Wilson in the opinions he had expressed. He, too, as an exporter of eggs, had had a similar experience to that of Mr. Wilson. They lost in shipping to England according to the season from 10 to 30 per cent. He found it more profitable to send only the large eggs to England as he could make more money on the small ones by selling them in Canada. In his opinion the egg trade had undoubtedly received a black eye by the imposition of the McKinley tariff. With the article of butter he did not think the same remarks applied, as he believed there was everything to hope for in the English market for butter, cheese, meat and hay. He had already shipped hay to England with fair results. However, he advised Canadian farmers to sell as little hay as possible as the ship companies, on account of its bulk, did not like to take it. As the first step in the way of reciprocity, he was in favor of the removal of the duties from English goods in return for the free market they give us.

T. Lloyd Jones thought if the rental value of land in Welland was only $1.50 per acre the farmers must have run the land down.

Mr. McEwing, speaking of the situation of the farmers, said that there was as much in finding new and good markets as in seeking modes of cheaper production. He did not think it would be in the interest of the Canadian farmer to rely on the English market alone, though he was in favor of cultivating it in every possible way. As there is no doubt about the advantages of the United States market to the farmer, it is their duty to make every attempt to gain that market. If we could not get free trade from the Americans he was willing to allow British goods in free. The farmer, he believed, had no right to sacrifice his own interest for the benefit of any other class. If he did he was the greatest patriot under the blue canopy of heaven, or the greatest fool on the face of the green earth. (Applause).

Mr. A. H. Pettit, referring to the trade in apples, said that the Spy was a better apple for the English market than the Baldwin.

Mr. Allen Pringle said the question was whether or not we should be content to send all our goods to the English market and send all our sons to the United States. Farms in the county of Lennox, which had lost between 5,000 and 6,000 of her population in the last ten years, could be bought now at a little more than the cost of the improvements on them, because the farms are mortgaged and the farmers are unable to pay their debts. Why are our sons going to the United States? Simply because they are so burdened with taxation that they can make no headway here. If the combines and monopolies were taken from their throats they would be able to live and to thrive in their own country.

Mr. Wilson, though disputing the statement that the farmers were not doing well, thought it was well that the question should be discussed, as had been done, somewhat politically. The trouble, in his opinion, was that the United States would not grant reciprocity in natural products.

Mr. Gifford believed that the only way to affect the Americans in the fixing of their tariff and to induce them to trade more freely with us was by showing good-will towards them. Other classes deal with the question of taxation in the way most beneficial to their interests, and the farmers should do the same.

Mr. R. Gregory thought, as the institute was divided on these questions, it was a mistake to introduce politics into the discussions.

Mr. Pike, asked if there was any prospect of getting a market for two-rowed barley in the Old Country.

Prof. Saunders, in reply, said that he had asked the farmers to send him samples of barley for the purpose of putting it on the English market through the High Commissioner's office. The answer he received was that the samples sent would bring from 36 to 40 shillings a quarter over there.

The President said that he not think the farmers should be at all sensitive in discussing questions like this. He would be ashamed of them if, because they differed on certain subjects, it would break up the Institute. (Hear, hear.) The finding of a market

in England is such an important one that the members of the Institute should hear everything that can be said upon the subject. Much useful information had been derived from Prof. Robertson's paper, and he thought a great deal of good would result from it.

Prof. Robertson said he had listened to the discussion and had not heard a single objection raised to a single conclusion he had reached. Mr. Wilson, of Seaforth, the king of the egg trade for years, had given them a not very encouraging statement about the possibilities of sending eggs to England at a profit; but it was a fact that eight shillings and six pence to ten shillings per long hundred of 120, had been obtained for them in the English market. There have been serious losses from spoiled, broken and inferior eggs; but a business is not opened up and established without losses at the beginning. Over two millions of dozens of eggs were sent to England during last year. That was our first year's experience in that business upon a large scale. The fact that a fair price was got for most of them, a profit made on many of them and not much loss suffered on any of them, was very encouraging and looked as if they would do better next year. It is just a question of "Where can we send our surplus eggs?" The only available market at the present time seems to be the English one; and we should try to make the most of it. Our best policy is to exalt and make the most of our opportunities, and to minimise and remove the obstacles and difficulties which we find in our way. I have addressed meetings of farmers in Vermont and New York, and have found them no more comfortable and fully more disheartened than the farmers of Ontario. Most men are easily discouraged—farmers particularly so. Their environment is rather limited; the nature of their work prevents them from enjoying general and frequent contact with men of other callings. They are ready to believe in a melancholy tale of their wrongs. Since the time when the serpent made Eve discontented with Eden, by his crafty presentation of its unendurable restrictions, the wily temptations of "professional personages" have been the bane of the credulous agriculturists. Be of good cheer; welcome the truth, the whole truth and nothing but the truth, and ye shall overcome and vanquish every oppression and depression that afflicts your business. It is hardly fair to assume and then to assert, that "the best of our people" are forsaking our land, or are being forced out of it, by any purely fiscal enactments of this country or any other country. Movements of population on this continent and elsewhere, depend upon the operation of other social and economic causes. If that be not so, how comes it that the loss or gain of population in the contiguous counties, on the borders of Canada and the United States, from the eastern point of contact in New Brunswick westward to the western boundary of New York, are almost identical? Many attractions are influencing the people on this continent, to mass themselves on its central belt. Among these may be named—humidity and moderation in climate, great mineral deposits, and agricultural resources that may be realised upon with the least exertion. Notwithstanding all these considerations, the northern bracing climate, develops a life with abounding energy for the harder tasks, which bring out the best manhood in the race. No, gentlemen, the best have not all gone south, you and I are still here. We have opportunities for a good market in England for most things. We could have a better market close to us for some things, if the people of the United States were only wise enough to accept our advice in the administration of their own affairs. The United States apparently do not want to buy some of our products. If England does, I would send them there; and if, after a while, the States want them at higher prices which will leave us more profit, I would send them there, and bear no grudge. (Applause.)

FREE TRADE.

Moved by Arch. Hislop, seconded by T. G. Raynor, That in the opinion of this meeting a policy of free trade such as prevails in Great Britain would be in the interests of this country. Carried (84 to 26).

WEDNESDAY EVENING SESSION.

The meeting resumed business at 8 o'clock, the President in the chair.

REPORT OF COMMITTEE ON NEW BUSINESS.

Mr. Allen Pringle, chairman of the committee on New Business, read the following report :

Your Committee on New Business beg to report as follows : In regard to the suggestion from the Ontario Fruit Growers' Association urging the passage of a resolution by this Institute with a view to correcting the false reports in England seriously affecting the apple trade with that country, we recommend that either the resolution submitted to us or a similar one be passed by this Institute.

2. We turn over the communication from the Dufferin Farmers' Institute as to lien notes and municipal reform to the Committee on legislation as coming within their province. Also we beg to refer the communication from the Welland County Institute in regard to the abolition of market fees to the Committee on Legislation.

3. In regard to the application from Charles Lawrence for permission to read a paper on "Barns Suitable for the Average Farmer," we beg to recommend that it be read provided that it can come in after the order paper is through.

4. In regard to the application from Messrs Mohr and Kidd to be heard in reference to the adjustment of the duties on pork, we beg to recommend the matter to the consideration of the Committee on Legislation.

Allen Pringle, Chairman.

Moved by Mr. Pringle, seconded by Mr. Kells, that the report be adopted. Carried.

The Committee on Legislation having gone to meet the Minister of Agriculture, the reading of their report was postponed.

THE POSITION OF THE FARMER IN THE PROVINCE OF ONTARIO.

Mr. Henry Brown, of Chesley, then read the following paper :

"Naught extenuate or set down aught in malice."

You are aware that at previous meetings of this Institute we had resolved and memorialized the government of the Dominion to grant us some relief from the burden of taxation which was steadily depreciating the value of our property and making farming an unprofitable calling. You are aware that we sent a delegation to Ottawa to endeavor to procure some amelioration of the combines system which sits like a hideous nightmare on the energies of the farmer; you are likewise aware that the government took no action on our memorial other than to increase our burdens, that our delegates were treated with scant courtesy by the combine lords of the Dominion, and that since then we had the whole system by which we are robbed, finished and nicely topped off by the McKinley Bill.

Since then I have pondered over the position of the farmers of this fair province, and wondered why a class of men on whom all other classes are dependent—an interest out of which all other interests have grown, the greatest factor in our social and political system, the most numerous, the great wealth producing class, should contentedly remain virtually unrepresented and without influence in the councils of the country, should contentedly continue to toil and moil to produce wealth to enrich every class except themselves—should contentedly remain hewers of wood and drawers of water; and the conclusion I have come to is that either the Ontario farmer is the most philanthropic, generous and unselfish being that has ever been evolved from modern social conditions, or else as a class we are the most simple and easily satisfied of mankind. And how dependent all others are upon him! As this is the age of strikes, let us suppose a universal strike of all the farmers everywhere, and that they refused or neglected to grow a crop for one year—what would happen? In a few months no parson would preach, no lawyer would plead, no doctor practice, no merchant sell goods—business would be paralysed. Or suppose every factory to go out on strike or up in smoke, as long as the farmer kept to work mankind could still eat, drink and be merry and would soon create wealth enough to supply the place of every one of them.

The Farmer as the Great Wealth Producer. All wealth is the product of labor; everything that is of any use to man is taken from the earth and is the result of labor. Therefore one would naturally suppose that the class who labored hardest, who produced the most would be the wealthiest, have the greatest abundance of all the means of enjoyment, and those who work not or who produce the least would be the poorest; for on every principle of right the man who works is entitled to all the benefits, all the advantages that may accrue from the products of his toil, and under just social conditions such would be the case. But as I shall shortly show you under present conditions it is far otherwise with the Ontario farmer.

Trade. All buying and selling is called trade, and all trading in its last definition is barter or an exchange of products. Money is only the common instrument or medium of exchange. It represents so much labor and therefore is exchangeable everywhere for its equivalent of the labor or products of some other man. It thus enables trade to be indefinitely extended, and the productions of one country or section of country to be bartered for the productions of some other country or section where the articles wanted can be more cheaply produced; and it is the natural right of every man to sell the products of his labor where he can sell them to the greatest advantage to himself, and buy what he requires where he can get them cheapest and best. And were the Ontario farmer a free man he would enjoy this right; but being a serf toiling to enrich others he is only permitted to dispose of his products and supply his little wants on such terms and under such conditions as will be most advantageous, not to himself, but to the combine plutocrat lord and his master.

Let me illustrate: For example, the farmer in the neighboring State of Michigan grows staple products similar to those of the Ontario farmer. The Southern farmer grows an entirely different class of product such as cotton, rice, sugar, etc. In short the thirty-five States and territories with their sixty-three million population, embracing as they do every variety of soil and climate, and producing everything necessary for the highest civilization, is without doubt the most self contained and independent country in the world. The Michigan or New York farmer can send his northern products all over that vast country and exchange them without let or hindrance for the rice of Carolina, the cottons of Alabama, the sugar of Mississippi, the oranges of Florida and bring home his trade without the interference of a customs officer. The Ontario farmer wants rice, cottons and oranges, too, but before he can put his products on the market that the Michigan farmer sold in and which is the only market he can profitably sell the greater portion of his products, he is met by the McKinley man who takes from 30 to 50 per cent. of all his sales, and reduces his purchasing power to that extent, and before he can get home with his rice, oranges and cottons he is met by the agent of the Canadian combines, and again fined 30 or 40 per cent. of the value of all he bought for having dared to exercise the natural right of every man, to sell the products of his labor where he could sell them best and buying where he could buy the cheapest. These are the conditions under which the farmer does his trade, and yet we are told that it would ruin us to have reciprocal trade with our neighbors and get rid of these two set of customs officers who it is easy to see take one-half and in some cases more than one-half of all the products that we buy and sell.

Another illustration: Take two farmers, neighbors, living somewhere on each side of the international boundary line. Suppose their farms equally good, and that each has raised for the market say, one span of horses, 1,000 bushels of barley, 500 bushels of potatoes, all equally good. The horse buyer comes along and pays the New York farmer $400 for his team; he jumps over the fence and he can only give the Canadian $280 for his team because the McKinley man demands $120 or 30 per cent. before he will allow the Canadian team to cross the line. Next day both go to, say Buffalo, to sell their barley; they sell for the same price, say 90 cents, and the Yankee comes home with $900 in his pocket. the price of his barley; no customs officers took aught from him, but the poor Canuck gets home with only $600, the McKinley man having taken 30 cents a bushel or $300 out of his sale of 1,000 bushels. Then they go next day to sell their potatoes, and they again sell in the same market, the only market the Canadian has to sell in. They again get the same price, say 50 cents a bushel, the New Yorker pockets his $250, while the man on the

Ontario side of the line pockets $125, the McKinley man having taken 25 cents per bushel or one half his potatoes. Then let each spend the price of his potatoes on supplies for the farm and family, and the American gets home all right with his $250 worth of goods without having met a customs officer, but the unfortunate Canadian is again met at the line by the agent of the combines and for the privilege of being allowed to get home with the $125 worth of goods purchased with the products of his own labor, after being robbed of $125 by the McKinley man, he is again forced to hand over this time to the Foster man in the interest of the combines $40. Then, but not till then, is he graciously allowed to take home his trade. Thus you see he went to market with $250 worth of the products of his labor, and he got home with only $85 worth of the labor products of some other man, whilst his neighbor just across the line had $250 worth of the same products for the same amount of his labor, so that protective tariffs robbed the Ontario farmer out of $165 or more than two-thirds of all his labor on this one small transaction, and something like two-thirds of all our buying and selling is done under similar conditions. And yet we imagine that we are free men and when we get a few horns may be heard singing that "Britons never, never shall be Slaves." Nor are we better if we send our products to the British markets, for if we escape the McKinley tariff, by going there, we have to meet and compete with the cheap labor products of the Zulu, the Hindoo, Russ, Lap, Dane, Swede and South American, as well as the cheaper corn-fed products of our neighbors. And to get there in winter we have to ship our products through their country to the sea, we have to run the gauntlet of three thousand miles of steamboat and railroad monopolies, roads that we have built and subsidised, and that discriminate against us and in favor of competing products. Britain is the best market for our cattle, yet we find that a steer worth $120 in Britain is worth only $60 here, and that it takes $4.20 or one-half their value to place a Canadian lamb or sheep upon the British market. So that as far as markets are concerned it is Hobson's choice—the devil or the deep sea—and for many of our products we have no choice at all. This is evident from the fact that even last year with the McKinley tariff in full force our trade with the United States is three and a half millions greater than our trade with Britain. Trade when free is cosmopolitan; it is no respector of persons, knows neither country nor clime, is destitute alike of feeling, friendship or loyalty. Trade flows where it can do the best, whether under the Union Jack, the Stars and Stripes of the States, or the Crescent of the Turk; it matters not. Where the conditions are most favourable there it goes, and we find that notwithstanding the immense barriers that at the dictates of monopoly the rulers of the two countries have erected to prevent it, three and one-half millions more of our traffic still climbs over these barricades. What greater evidence that it is our best market, the great market, and that free entry thereto would open up unlimited possibilities to the enterprising farmer of Ontario. The hollowness of the trade with Britain is seen in the fact that upon the $15,000,000 worth of goods that the Province of Ontario imports from that country we levy an average duty of over 30 per cent., whilst on the $25,500,000 that we import from the United States the average duty is less than 20 per cent.—a discrimination of nearly 11 per cent. against British trade. But let me tell you that although the average duty is 11 per cent. less, it is no less on goods imported for the use of the Canadian farmer. On all that concerns him he has to pay his 35 or 40 per cent. every time no matter where the goods come from; the difference is solely in the interest of the manufacturer. The woollen manufacturer can import all his wool, soap, grease, dye stuffs etc., to compete with the home product, and pay no duty. The tanner all his hides, bark, oil, and the cotton manufacturer all his raw material, the miner his machinery without paying one cent duty. In all the illustrations I have given I have presented the position of the farmer in the best possible light. I have supposed him to be his own merchant, his own buyer and seller, his own exporter and importer, and have calculated the duties paid by him on his purchases at 30 per cent., whilst on nearly every article in which the farmer is interested, such as agricultural implements, machinery, harness etc., the duties are 35 per cent.; on barbed wire it is $1\frac{1}{2}$ cents per pound or over 40 per cent. Just fancy, $15 on every thousand pounds of wire we are legislated out of our pockets and into the pocket of the manufacturer for which he gives you nothing, and multiply that by all your business transactions in a year and you will find out why farmers don't get rich.

Take another illustration to show what a 35 per cent. tariff really means to the farmer. A merchant imports say $100 worth of goods and on these he pays duty $35. This makes the cost of the goods $135, to this he adds the wholesale profit of say 20 per cent.; that adds one-fifth or $7 to the $35, making it $42 to the retail merchant, who then adds his 30 per cent. on the $42, which makes the duty 54 per cent. to the purchaser of the goods; so that on your one dollar's worth of goods you pay 54 cents duty and 50 cents commission. Thus for one dollar's worth of goods you have to pay $2.04, and then remember that you pay this with the money that you got for your barley or your horses or your potatoes, out of every dollar of which the McKinley tariff has taken 33 cents, and you will find that it has taken $3.05 worth of the products of your labor to purchase one dollar's worth of the products of the labor of some European pauper or Canadian combine. Now if these figures are correct or nearly correct, if these statements are facts or near the facts, and no one will be happier than myself to find that they are grossly wrong, the position of the Ontario farmer is simply this: that under present conditions he works one day for himself and family and two days for some one else. What wonder then that our farms decrease in value, that population leaves the country and that our young men leave the farm?

It is easy to see that the merchant paid nothing of that tariff tax; he added it to the price of the goods and the buyer paid it. Neither tariff nor merchant added anything to the value of the goods, but they doubled the cost of them, and you paid for them with money you had got for products you had sold and out of which McKinley and the middle man had taken perhaps 50 cents on every dollar. As the great army of non-producers don't pay any taxes, they have nothing to pay taxes with until by some device they get it out of some one who has been at work and produced some article of value.

Let me illustrate this; suppose all the farmers turn lawyers, preachers, doctors and non-producers generally, and that we tried to live by trading legal opinions for medical prescriptions or sermons, how long do you suppose society would exist? Not twenty-four hours, and in a few weeks a few piles of cleanly picked bones would be the only relics of humanity. Or suppose you loaded a ship with such productions, you could not trade them for enough to pay the tariff on a yard of cotton. Such products do not feed, clothe or shelter humanity. All the speculators on Wall street do not produce wealth enough in a year to dine a dog, although they may have pocketed millions earned by other people's labor. All the legislation at Ottawa never made Canada one cent richer; it is only labor that makes wealth, but they have legislated millions of dollars out of the pockets of those who earned them honestly into the pockets of those who toil not neither do they spin but live and fatten on the toil of others. The great robbers of industry are not behind the bars at Kingston, but you will find them all behind an Act of Parliament. There you will find all our professional gentlemen, all our privileged classes, all our combines, all legally authorised to rob and safely protected behind an Act of Parliament. I am well aware that many non-producers act as ends to production, but these now are nearly all monopolies entrenched behind Acts of Parliament, and take more than their fair share of the products of the farmer—in fact squeeze the last cent out of him, and leave him just enough to live and labor on. These all get rich and live in luxury, while those who toil to feed, clothe and enrich them, are little better than serfs, and in fact that is really what they are. Yet these are the classes, the men we look up to and venerate, and instead of using our own brains, keep them in luxury to think for us and actually send them to Parliament to legislate in our interest. Of course it is their own that they look after, and that is why we are in the soup to-day. It is human nature, and who can blame them? Certainly not the farmers who have sent them there. The farmers have the votes, and if these Institutes have any mission it ought to be to organise and educate the farmer to use them in his own interest as all the other classes do, to send men of his own class, men whose interests are identical with his own to represent him. Then, but not till then, will things begin to mend; then, but not till then, will the farmer assume that position and exercise that influence in the affairs of the country that his numbers and the magnitude of his interests entitle him to occupy. Then, instead of humbly and vainly petitioning our masters for a small measure of relief from the burdens and extortions piled upon us, we

will be in a position to do justice to ourselves and every other class, wipe all monopolies from the statute book, make every worker a free man and not a slave toiling to enrich some master more heartless and avaricious than Legree. There are thousands of farmers in Ontario to-day, and I know some of them, whose farms and chattels are mortgaged for every cent, who would sell and leave if they only had enough to carry them away; whose lives and those of their families are an unceasing round of drudgery and want, compared with which, life on the plantation in the palmy days of slavery was luxury itself, and with the majority it is a struggle for existence in which only the fittest can survive.

Mr. T. Lloyd Jones.—We are always glad to see and hear our old friend Brown. His paper this evening was excellent, full of truth, but all on one side. It was really a political speech, with not a word in favor of the Government that took off the duties on tea, coffee and sugar. We must have a revenue, and I would like Mr. Brown to explain how he would raise it. I am in favor of raising it on the luxuries, not the necessaries of life. I would prefer free trade with England, or with the world, rather than with the United States alone. Reciprocity was defeated at the last election. If the position of the farmer is considered it will be seen that it has been improved wonderfully of late years. The people of Ontario and the people of every province in the Dominion, have prospered more in the last twelve years than any twelve previously.

Mr. McEwing.—Mr. Jones has only told you half the truth about the sugar question. The duty was taken off raw sugar, but not off the manufactured article. The sugar lords are in as good or better position than ever. Has the duty been taken off binding twine? No. I may safely say that the farmers of this country were the only class who had their request refused in the matter of re-arranging the tariff. Reciprocity was not defeated, since at the last election both parties made it a plank in their platform. The question is not, "Are we more prosperous than we were 20 years ago?" but, "Are we making the best of our advantages to-day? Are we getting a full return for the money and labor we expend, a fair share of the proceeds of our labor?" I claim we are not. It behooves the farmers to stand together and urge on any policy which is going to be of advantage to them, irrespective of party.

Mr. Morris.—In the riding I come from, six out of ten farms are mortgaged. I ask Mr. Jones if that is prosperity?

Mr. Sutherland.—I am tired of reciprocity and political subjects, and would like to hear something about agriculture.

Mr. Duff.—We are not here as Reformers or Conservatives, but as farmers, to discuss questions for the best interest of farming. No vote was ever taken more unadvisedly than that this afternoon. We are advised to go upon the same line as the people of the British Islands, although we are not in the same position. Take for instance the duty on pork; if it were removed we would be swamped with American pork. As to the position of the farmer, whatever line you pursue you must be industrious, and I really believe that the great reason why there are so many of these things called mortgages on our farms, is because our people have not attended to their business.

Mr. Gifford.—I think it is not advisable to go back into the past and compare it with the present. We have to admit the fact that our farms are mortgaged too heavily and sell at too low prices, and the question is how to remedy it.

Hon. Mr. Ballantyne.—My friend from South Simcoe is mistaken when he says reciprocity would affect Canadian pork. The firm of Wm. Davies, of Toronto, are the largest packers, and make the price for Canada. They pack exclusively for the British market, and they are not prevented by any duty from importing and slaughtering American hogs. They cannot get a sufficient supply of Canadian hogs. Canadian hogs are superior to American because better fed, being fattened chiefly on grain and dairy slops.

Mr. Pettit.—Mr. Brown thinks we are hewers of wood and drawers of water. If so, from the appearance of this audience, we seem to be engaged in a very healthy and lucrative occupation, but I do not think he has given a correct picture of the farmer of Ontario to-day.

The PRESIDENT.—The question is shall we receive this paper of Mr. Brown's and tender him a vote of thanks for the manner in which he has prepared and delivered it? You may differ somewhat from the sentiments expressed, but no one can differ on the point that it is an admirably prepared paper. Is it your pleasure that the motion should prevail? Carried.

CANADIAN FRUIT AND ARSENIC.

Mr. WOOLVERTON, of the Fruit Growers' Association, quoted from an article in the English *Horticultural Times*, which spoke of "Arsenic in American Apples," and added that apples are actually coated with the poison, and the reason they look so well is on account of the arsenic. The fact is that the amount of arsenic used here in spraying trees is infinitesimal, and is used three or four months before the apples have attained any size. In New York some 200 tons of grapes were seized, but upon an analysis it was found that a person would have needed to eat 16,000 pounds of these grapes to get enough arsenic to kill him. Dr. Van Hyke, at the meeting of the New York Horticultural Society, said that upon careful analysis after fresh spraying with this mixture, only 1-30 of a grain in the pound could be found; $\frac{1}{4}$ of a grain is given as a dose in medicine, therefore a person would need to eat eight pounds, skins and all, to get so much as one dose. These facts should be communicated in some way to show the humbug found in these papers.

A resolution was passed to the effect that Sir Charles Tupper, the High Commissioner, be furnished with information to confute any impression that may have been formed by such statements.

THE WORLD'S FAIR.

The PRESIDENT then introduced Prof. WM. SAUNDERS who said: You are aware that there is to be a great exhibition in Chicago to commemorate the 400th anniversary of the landing of Columbus. I think it will be an occasion when Canada should come to the front as an agricultural and horticultural country. We have secured sufficient space, and my idea is that the agricultural products of Canada should be shown from the Atlantic to the Pacific, and that this should be not simply a Government exhibit but a farmers' exhibit. I want the co-operation of every good farmer in the Dominion. I should like some of the crops of 1891 as well as 1892, as it is just as well to have two chances. I would like any farmer who has a good sample, to mail me a pound of the grain so that I can test the weight, compare it with other samples, and find out if it is a good representative; if it is I shall be glad to order a bushel from that party at a fair price. We have also secured a large space in the horticultural hall, and next year we will get together a collection of fruits. I hope as a result of this visit and these few remarks, to hear from a good many people during the next month or two, and to succeed in bringing together samples of all the grain from the different parts of this great province. I have great faith in the country, and I think we will show that Ontario is entitled to lead, as she has done in the past, in regard to all the important products.

The PRESIDENT.—I understand there is to be no prize list except in the live stock and poultry departments. In the other departments diplomas or medals will likely be given. You have heard the request of Professor Saunders, and I have not the least doubt that as many as possibly can, will respond to his invitation to send samples of grain. There is an invitation from Steele Bros. & Co., Seed Merchants, to the members of this Institute, to visit their establishment and see the methods adopted by them for cleaning seed.

It was decided that the Secretary notify Mr. Steele that the members would visit his establishment between half past one and half past two on Thursday.

The meeting then adjourned.

THURSDAY MORNING SESSION.

The Institute resumed business at 9.30, the Vice-President in the chair.

The following motion was read: Whereas it is just to the representatives of County Institutes that District representation on the Executive Committee should be acknowledged, therefore, moved by H. C. Hoar, seconded by J. H. Best, that on the morning of the second day the delegates of the Central Institute separate themselves into their individual Districts and nominate and elect by ballot or by open vote their member for the central executive committee, and those submitted for the approval of the assembled convention.

Moved by Mr. Brown that this motion be laid on the table until the afternoon session. Carried.

THE ADVANTAGES OF EXPERIMENTAL FARMS.

The Vice President then introduced Prof. Wm. Saunders, Director of Experimental Farms, who read the following paper:

The subject assigned to me by your committee is that of "The advantages the Experimental Farms are or will be to the farmers of the Dominion." This is a very wide subject, and might be treated of in a great many different ways. I shall first, however, advance to you the proposition that the experimental farms in their distribution and the selection of their sites, and in the special lines of labor they are carrying on, are designed and are being operated with the express purpose of helping the farmers of the Dominion in every possible way, and I hope as I go on, to substantiate the correctness of this proposition.

The science of agriculture, in which I include the practice also, is in many respects in the experimental stage, and in regard to some of its operations it can never be expected to get beyond that stage.

Every farmer carries on to a greater or less extent an experimental farm, and for the reason that no two farms have exactly the same soil and conditions. Every farmer, if he is to succeed, must use such skill as he can command in finding out what are the good points and where the weak ones are in connection with his farm, so that he may bring about the best results. He tries first one thing then another, and if he is a skilful and thoughtful man he gradually finds out, or at least forms an opinion based on experience, as to what is best in his particular case. The conclusions he reaches, and which are so valuable to him, may be of much less value to his neighbor, and it often happens that where the result of one man's labor and experience would be valuable to another, that that experience is private property, and is not always at the command of the individuals who need it. On the other hand all the experience gained by the tests made at the experimental farms is public property, and all that is deemed valuable to the farmers is published from time to time in bulletins and reports which every Canadian farmer can obtain by asking for them, so that if he has not the opportunity of visiting the farms he can at his own leisure acquaint himself with all the more important results obtained by the careful and persistent experimental efforts which are being made at these several experimental farms.

Permit me first to call your attention to the system and plan of the Dominion experimental farms covering the whole territory of the Dominion. These farms are five in number. There is a central farm located at Ottawa to serve Ontario and Quebec, and four branch farms to cover the outlying territory. I shall first call your attention to the branch farms and to their work. The farm for the maritime provinces is at Nappan, Cumberland County, N. S., adjoining New Brunswick, and almost directly opposite to Prince Edward Island. We have there a position which represents fairly the average climatic conditions of the maritime provinces, and is reasonably accessible to all the farm-

ers in that section. There is a very large area in the maritime provinces suited to general farming and also to the raising of coarse grains for stock feeding, for dairy work and for producing beef. The natural advantages of that part of the Dominion are very great; the atmosphere is moist; there is a plentiful supply of good pure water, and there are marsh and dyke lands which are of almost inexhaustible richness for the production of hay. It is not an uncommon thing to find these dyke lands giving for fifty years running, two crops of hay in the season, and where it is only cut once, it is very frequently used in the autumn for pasture. This is done without manuring the soil, and when the hay crop begins to materially decrease the soil is plowed up, sown with oats and seeded down with grass for another period of years. In most districts the earlier ripening varieties of corn can be grown to advantage and cured or converted into ensilage for winter feed. By providing an abundance of food the farmers can winter more stock, and thus add considerably to the product of their farms. It has been too much the custom for farmers in these provinces to ship their hay to the United States instead of feeding it to their stock, and thus the fertility of their lands has been lessened. Great as this fertility is it can in this way be exhausted. At the Nappan farm the example has been set of feeding nearly everything grown on the farm to stock, and with the manure obtained, gradually enriching the land.

To secure the 300 acres required for this work, two farms were purchased, one of which was in a fairly good state of cultivation, while that adjoining had been so neglected that it was regarded as a worn-out piece of land, almost worthless, which no one would care to handle; it had been offered for sale for several years without a purchaser. By reasonably good treatment that farm which was supposed to be so badly run out, has become the best part of the whole farm, not so much by heavy fertilising as by plowing deeper and working the soil up in good shape, and growing such a succession of crops as were likely, with the manuring it could get, to bring the land into that condition of fertility which was desired. A large number of cereals have been tested from year to year, with a view of ascertaining the most profitable for the maritime provinces; also fodder plants and grasses, and a number of other products. Cattle have been sent there, mainly of the dairy breeds, Ayrshires and Holsteins, and milking strains of Shorthorns, and the foundation has been laid for a useful herd of animals which will be a benefit to the whole country.

Passing westward the next farm is located at Brandon, in Manitoba. A large number of experiments have been carried on there with grain, roots and mixed fodder crops in order to ascertain which are likely to be most useful and profitable to the farmers of that province. Special attention has been paid to those varieties of cereals which ripen early. One especially which is commanding increased attention is the Ladoga wheat. This wheat is not of much value in western and southern Ontario for the reason that it rusts to a greater degree than many other sorts, but it has been found of great value in that dry climate of the north-west where very little is known of rust. The red fyfe, however, is the favorite with the millers on account of its excellent quality.

Successful efforts have been made to solve the problem of winter food for stock. When there was an abundance of wild hay lands available, all the farmers had to do was to go out and cut from these enough hay to serve for their stock for the winter, put it up in stacks and draw it in at their leisure during the winter; but with the increased settlement and the vast increase of stock this is no longer practicable. The hay lands are quite insufficient to meet the requirements of the case, and in many districts farmers have now to drive 30, 40 and 50 miles to get wild hay, and this has forced on them the conclusion that they must grow on their own farms food for their stock during winter. In order to solve this difficulty many experiments have been tried with fodder plants of all sorts. There has been some measure of success with the mammoth clover and in some parts of the country with timothy, yet as a rule these plants, so serviceable in the east, are not reliable there, and for that reason we have to fall back for the time being on mixed crops. These are obtained by mixing together barley, peas and oats or barley, peas and tares, or wheat, peas and oats and other similar mixtures. The quantity of the mixed seed sown is usually about three bushels per acre, and the yield of these crops for cured hay has been greater than was anticipated, being from three to three and three-quarter tons of cured fodder per acre. The best yield in Brandon in 1890 was with a mixture of oats and peas

sown after roots which gave 3 tons, 1,659 lb. to the acre. In 1891 eight pecks of black Tartarian oats with four pecks of Prince Albert peas on one acre gave 13 tons, 275 lb. of green fodder which when cured as hay weighed 4 tons, 1,675 lb. A mixture of eight pecks of black Tartarian oats and four pecks of large English tares gave a still heavier crop of 13 tons, 650 lb. of green fodder and 5 tons, 510 lb. of cured hay. A yield so large as this and so easily obtained completely solves the difficulty of providing nourshing food for stock during the winter to take the place of the wild hay. With regard to the use of these plants cut green for hay I may mention that in California the use of barley hay is almost universal. Barley is grown there and cut green for this purpose and cured, and a ton of barley hay on the San Francisco market will command usually a higher price than the best timothy, showing that the experience on the Pacific coast is largely in favor of such grain crops cut green, and their chemical analysis has shown that they contain all the nutriment that stock need. I think that the growth of these crops in Ontario should be more widely tested. We have been trying them in Ottawa and find them exceedingly useful in the summer. We have raised from 10 to 11 tons of green food per acre in that way, a much heavier yield than we can get from any hay lands we have. In the maritime provinces this system has been carried on for a very long time, and most of the farmers put down more or less of their land with such mixtures to be cut green for hay.

Experiments have also been made at Brandon in methods of treating the soil, summer fallowing as compared with fall and spring plowing ; also seeding at different depths and with different quantities of seed and the use of different sorts of drills ; also with roots and potatoes ; experiments with various trees and shrubs to determine their hardiness and the planting of tree belts for shelter. At the present time there are planted on the experimental farm at Brandon, more than 50,000 trees, and most of them are growing and doing well. We hope to make that a pattern farm as far as tree planting is concerned, and through the influence that will exert on the farmers in the neighborhood we hope to see tree planting stimulated.

Stock also has been provided at Brandon. Durhams, Holsteins, Ayrshires and Galloways. Feeding experiments are in progress with steers to determine how they can be cheaply produced, and also with hogs to determine the value of frozen wheat as food for swine.

The farm at Indian Head is located 182 miles west of Brandon and possesses a climate which is dryer than that of Brandon. The soil is of an entirely different class, and represents fairly a very large area of the settled land in the North-west territories. Similar experiments have been carried out here in testing different varieties of grain, in methods of treatment of land and depth of seeding. With similar lines of work the difference in climate and soil will often produce very different results from what is obtained at the Manitoba farm, showing the importance and necessity of these two farms although not quite 200 miles apart. Much useful information has been obtained here in regard to fodder plants and different mixtures of grain, such as I have referred to. In 1890 mixtures of rye, tares and oats gave good results, but spring rye alone cut green produced the best quality and largest quantity of hay, the crop varying from $2\frac{1}{2}$ to 3 tons per acre. So heavy a crop has not been had from rye in Brandon. During last year the best results was from a mixture of wheat and rye cut green, giving four tons per acre. Next best, wheat and tares, 3 tons, 1,200 lb. of cured hay per acre. In this manner the difficulty which had stood in the way of the progress of the dairy interests in this large part of the Dominion has been practically removed Experiments with fodder corn at Indian Head have not been as successful as at Brandon; the season is shorter and corn does not attain to a satisfactory degree of development there, so we do not expect that corn will be of very much value in that district. The largest crop of potatoes at Indian Head has been 463 bushels per acre, grown from a seedling potato known as No. 80, from the farm at Ottawa. Experiments have also been carried on with the native grasses. The superintendents have had the seed which grows on the prairie gathered and sown in small plots. In this way seed can soon be produced in sufficient quantities to sow these grasses by the acre, and we find that they are very much more successful

and yield a heavier crop than any of the cultivated varieties which are grown in the more moist climates of Ontario, Quebec and the maritime provinces. Similar classes of stock have been introduced at Indian Head to those at Brandon, except that Polled Angus have been sent there as one of the beefing breeds instead of Galloway. These June bred animals will be valuable to the farmers of those partially settled portions of the Dominion.

The most westerly of the branch farms is that at Agassiz, B.C., situated about 70 miles east of Vancouver. The climate there is not unlike that of England in many respects with about the same rainfall, perhaps a little heavier sometimes. It is mild during the winter and well adapted to the raising of fruit in great variety. It is intended to make a large test orchard there which will be valuable to the people of that province, where they can gain information as to the varieties of fruit of all classes which are the most profitable and productive, and where they can find everything correctly named. It is not in any way intended to go into fruit growing commercially, but by planting two or three trees of a kind and covering the whole list of the varieties grown here in the east, in the southern states, California and Europe, we shall after a time get together a mass of information which will be of inestimable value to that country. I shall not burden you with many figures, but to give some idea of what is being done I will give you the number of varieties which have been planted during the past two years.

143 varieties of apples; 10 varieties of crab apples; 55 varieties of pears; 68 varieties of plums (including new Japanese sorts); 47 varieties of cherries; 117 varieties of peaches; 20 varieties of apricots; 12 varieties of nectarines; 7 varieties of quinces; 11 varieties of figs; 3 varieties of mulberries; 24 varieties of nuts; 8 varieties persimmons, Japan. Total 525.

Figs do very well and the different sorts of nuts, especially the English walnut and filbert and the different varieties of chestnuts and peccans. The Japanese nuts also grow very well here, and we hope in a short time to be able to demonstrate what trees are likely to be of permanent economic use to that district. Among the large number of varieties under test many may turn out to be inferior, but such information is beneficial to the farmers because they are thus saved from experimenting with unprofitable sorts. Experiments are also carried on there with grain, roots and fodder plants, as it promises to be a country where the dairy industry may be developed to a considerable extent. Corn has grown well; the grasses succeed remarkably well, so also do many varieties of fall wheat. A barn and stable has been contracted for and is to be finished in a few months, when we expect to introduce some good breeds of stock. We already have a Durham bull and two or three cows, and hope soon to carry on a very useful work in this direction on that distant farm. There is a very large area in that part of the Dominion which is rocky, but which has among the rocks, here and there large patches of good soil. Such land is of no value for ordinary agricultural crops but it may be used for growing trees. Timber grows most luxuriantly. There are many trees on the experimental farm which measure upwards of 200 feet in height and 4 or 8 feet through, such gigantic trees as one never sees in any other part of the Dominion, but there are no hard woods at all. On the farm we have introduced the black walnut, cherry, elm, hickory and ash, and all the useful hard woods of the east. Some of these have been planted on these rocky lands to determine how far such land can be made useful and profitable for growing timber. The growth in this part of British Columbia is much more rapid than in the east, and if we can establish the fact that such land otherwise waste can be used for timber growing or for fruit growing it will in the course of time become of great value to this country. A large number of varieties of shrubs and trees have been planted on this farm so as to show the character of the climate to visitors who may go there to gain information regarding the country. Experiments are also carried on with poultry which promises to be a profitable branch of agricultural industry. At present large quantities of eggs are brought from Manitoba and elsewhere.

Among the more important branches of work at the Central Farm at Ottawa are the experiments with cereals. During the last five years tests have been made of almost every obtainable variety; a great many have from time to time been discarded and only the most useful retained. Last year there were in all 187 named varieties

under test of wheat, barley and oats and of cross bred varieties produced on the farm 114 additional sorts, making 295 varieties of cereals in all. In addition to the tests of varieties, experiments have been carried on with sowing at different periods. a week apart for five or six weeeks, the use of different sorts of fertilisers, natural and artificial. Among the best yielders in spring wheat are Johnston's Defiance, a wheat obtained in Manitoba some two years ago, which gave 45 bushels, 21 lb.; Ladoga 28 bushels, 32 lb.; White Fife 29½ bushels; White Chaff 28 bushels, 51 lb. On one piece of ground a large number of different varieties were sown in $\frac{1}{20}$ acre plots all on the same day and under the same conditions. In comparing these with the field crops referred to, we find the figures changed very materially. Johnston's Defiance drops to 19 bushels, 17 lb.; Ladoga drops to 21 bushels, 7 lb.; White Chaff drops to 25 bushels, 13 lb. The varieties which gave the largest yield are: Red Fern 35 bushels, 30 lb.; Rio Grande 35 bushels, 7 lb.; Goose 33 bushels, 35 lb. It will be seen that these results seem to contradict each other as to the relative productiveness of varieties, showing that it is not wise to form hasty conclusions. There are many problems which we may never be able to unravel, but we hope to be able to explain these apparent contradictions in time. In barley the largest yield during the past year was "Rennie's improved six-rowed," which originated with Mr. Wm. Rennie of Toronto. This gave us, on a piece of land, after oats, a light soil but in good condition, the extraordinary crop of 77 bushels, 24 lb. Some of this same lot of seed sown on an extra poor piece of land which had not received much cultivation, a light clay loam of fairly good texture but much run out, gave only 19 bushels, 23 lb. These plots were not more than two or three hundred yards apart, showing that the question of soil as well as that of season and seed, is one of the vital points; and also the necessity of having the soil not only well cultivated but well fertilised. The Danish Chevalier, a two-rowed variety, gave 43 bushels, 41 pounds. In the small plots the two-rowed varieties led in point of yield. The Phœnix von Thalen, a German variety, gave 54 oushels, 32 lb.; the Oderbruch, six-rowed, 51 bush., 32 lb.; the Italian, two-rowed, 49 bush., 36 lb.; Danish Printice 49 bush., 30 lb., and Goldthorpe 49 bush., 28 lb. The Rennie's improved six-rowed drops in the small plots to 41 bush., 32 lb., and Baxter's to 40. The Duckbill, two-rowed, comes out about even with the Italian and Goldthorpe, and this is one of the varieties which I think will grow in favor, by reason of its being more upright in habit and a little stiffer in the straw, and hence less liable to lodge.

In oats in field plots the Oderbruch, a variety which has heretofore not done very well with us, heads the list with 84 bushels 33 lb. Next, the Rosedale with 83 bushels, 6 lb. Giant Swedish 67 bushels, 26 lb. In a smaller plot the Cream Egyptian ranks first with 57 bushels, 12 lb. This was got from the maritime provinces, but does not seem to differ from the ordinary Egyptian oats commonly grown in Ontario.

Six varieties of grain were selected for sowing at different times so as to gain some further experience as to the best time for sowing, beginning with the earliest period at which we could get the seed in the ground and sowing a week apart for six weeks. These plots were one-tenth of an acre each, the crops were carefully harvested separately and threshed separately so as to get the exact yield. The highest yield of wheat was Campbell's White-Chaff. 47 bushels, 50 lb. per acre.

Of barley, Baxter's Six-Rowed 67 bushels, 4 lb., Carter's Prize Prolific 65 bushels, 10 lb.; of oats, Banner, 87 bushels, 22 lb., Prize Cluster, 84 bushels, 4 lb.

My object in giving you these figures is to show how very variable the results are even on the same farm on pieces of land supposed to be in fairly good condition and fairly even in their character. It is evident that we should not be hasty in drawing conclusions from any one season's work, but that we should go on from year to year and accumulate information so that we may from the average of results in a series of years gain some conclusion that will be approximately correct.

The results given point also the importance of the work of distributing varieties of grain in different parts of the Dominion so that we may have them grown under varying conditions, and by taking the average of a large number from several hundred to two or

three thousand tests be able to reach conclusions in one or two years which otherwise, would take many years to overtake as to the relative fertility and productiveness of the different varieties under test. At Ottawa during the past four years a great deal has been done in the way of distribution of new sorts, one object being to gain the information referred to, but the prime object has been to introduce in this way such varieties as are likely to be an improvement on the sorts that are now in cultivation, and thus raise the standard of the grain grown throughout the entire Dominion. From what has been done in the last four years I think it is not too much to expect that within another five or ten years the efforts made at Ottawa will have produced an important result in adding largely to the value of the entire crops of the country by introducing better seed and placing it within reach of all. In 1888 grain was distributed to 1,500 different farmers; 2,960 samples went out in 1889; in 1890, 12,353 samples went to 5,896 farmers; and in 1891, 12,285 samples to 5,140 farmers. So that in this period over 13,000 farmers have been reached and 29,098 three pound packages have been distributed, This involves a very considerable amount of labor and correspondence. The letters received at the Central Farm for the last two years average over a thousand a month, which keeps us all busy giving the information asked and endeavoring to satisfy the inquiries of farmers everywhere in regard to different branches of work they are carrying on.

In wheat, barley and oats a line of special work has been undertaken at the Central Farm in producing cross-bred sorts. I occasionally meet farmers who do not fully understand what this means. Those who do will pardon me if I explain it. If you take a spikelet of wheat on a head recently formed and remove one of the outer pieces of chaff, and open the inner portion, you will find in the early part of the season the organs of a flower there. There is a central pistil, a soft fleshy growth, in the bottom of the enclosure, and surrounding that there are three stamens, little short threadlike organs, with a club-like top which contains the pollen by which the flower is fertilised. We usually see nothing of these floral organs until after the pollen has done its work and the grain is formed, then, the anthers, which are of no further use to the plant, are pushed out through the sides, and hang down. When this stage of growth is reached we speak of the grain being in blossom, but this is not correct since fertilisation has already taken place. In crossing, all that is necessary is to take away the stamens, before the pollen is ready to be shed, and bring the pollen from some other variety and apply it to the pistil and then wrap the flowers operated on in a piece of tissue paper. If the operation is successful the resulting kernel will be a cross between those two varieties, and in this way a new sort is originated.

I have one of these cross-bred wheats here which I will give you the history of. The work was begun four years ago. It is a cross on the Ladoga as female with the Red Fife as male, one kernel was planted three years ago and the variety which promises to be very productive, has received the name of "Abundance." From this one kernel planted in 1889 we now have over 360,000 kernels, which weigh about 63 lb. to the bushel. One peculiarity of this variety is that it seems to be a pure hard wheat. With the progress of milling the hard wheats have risen in value and the nearer we can get to a hard wheat in Ontario the more profitable it will be provided that hard wheat is glutinous and not ricey. A variety like the "Goose" is hard enough, but it has that ricey character with a low proportion of gluten in its composition, and therefore does not make a strong flour, and the millers do not like it for that reason. But this wheat will, I think, make almost as strong a flour as Red Fife. We hope to be able to distribute this wheat in the course of a few years among the farmers for test in the different parts of this country. When we consider that all the varieties we now have in cultivation have in the past arisen mainly as chance varieties—we scarcely know how, for very few are the results of cross-breeding —and when we bear in mind how important it is that we should have productive sorts you will see that this class of work is perhaps one of the most important in its character which could be undertaken. In a few years we shall, I hope, have originated varieties which will be eminetly useful in this and the other provinces, and more profitable to grow than any of those now cultivated. In the spring of last year a few kernels of several crosses were sent to the experimental farm at Indian Head to be tested, and also to

Agassiz, B. C., and in the last few days reports have been received of the results. From 30 kernels of this variety at Indian Head there was 6 oz. of yield. This was not as productive as some of the other sorts, showing that a variety which is very good at Ottawa may fall behind in other localities. 36 kernels of another variety called "Ottawa" gave 1 lb. 2 oz. Another variety gave 1 lb. 1 oz. from 37 kernels, a very extraordinary yield. In British Columbia 15 kernels of one sort gave 12½ oz.; another from 11 kernels gave 11½ oz. One of the varieties ripened there six days earlier than the Ladoga wheat, but in our experiments in Ottawa we were unable to detect that difference in earliness. For fuller information regarding our work I would refer you to the reports of the experimental farm. Any farmer who chooses to ask for these publications can have his name placed on the mailing list and receive them regularly. We want the cream of the farming population of the country to get our publications, as they will utilise them to good advantage, and we think it only reasonable to expect that any farmer who wants them will be willing to ask for them. There are already on the mailing list about 25,000 names, and I have no doubt that number will be doubled in the course of a year or two more. The intention is to make our publications, which cost a good deal of money to produce, valuable wherever they go, and send them to all those who are likely to appreciate them.

With regard to oats, in testing the proportion of husk to kernel we found that in the Banner oats grown in different parts of the Dominion the proportion of hull is 26.18 per cent. to 29.98. The Prize Cluster varies from 27.08 to 32.49. This indicates that climate and soil have something to do with the thickness of the hull of the oat. The investigation has not been carried on long enough to permit of a definite conclusion being reached, but as a rule we find the heavy oats from the North-west territories are thicker in the hull than the same oat grown in Ontario. The Flying Scotchman varied from 27.98 to 29.98; the Bonanza from 27.98 to 33.39; the Victoria Prize from 29.98 to 30.69. Averaging the whole of these roughly they would run from 28 to 29 per cent. of hull to kernel. There is a new oat which has been brought out in England known as the Royal Doncaster, said to be very thin in the hull. Samples have been obtained and we found on testing them carefully that the proportion of hull was 21.67 per cent., a difference of from 7 to 8 or 9 per cent. in favor of that particular oat in regard to the thinness of the hull. Enough of this variety has been secured to give a limited distribution of them; we shall also have enough to test them thoroughly on the experimental farms, and I am of opinion that it is a variety which may be very valuable in this country. If we could substitute for the oats now grown in Canada thinner hulled varieties giving us say six per cent. less husk than we have now it would make a difference in the value of our oat crop of about two million dollars a year. Hence this is a point well worth considering and working for.

I must say a few words on the subject of peas. This crop is a very important one. We export peas largely, yet I find a good deal of indifference amongst farmers as to the varieties they grow. On enquiring among the dealers who handle peas for foreign markets they tell me that for the larger varieties of peas there is an almost unlimited demand in Europe and they are worth about 90 cents a bushel, while the smaller varieties which have to be consumed at home are worth about 60 cents. It would seem to be to the advantage of farmers to grow the larger varieties unless it can be shown that the crop is so much smaller as to make up the difference. I will give you the results at Ottawa this year which seem to show that the smaller varieties are the best yielders with us, although I found the reverse to be the case on some of the other farms. Our field crops this past year have run as follows: Crown, 47 bush., 11 lb.; Golden Vine, 44 bush., 7 lb.; Prince Albert, 40 bush., 2 lb.; Black-eyed Marrowfat, 34 bush., 21 lb.; Mummy, 39 bush., 13 lb.

There is not a very great difference in the yield, nothing like 50 per cent. between the larger and smaller sorts, and it is a question well worth considering by farmers whether it would not be to their advantage to grow a larger proportion of those peas which command the higher price in the market. There is another point I wish to mention in connection with peas and that is their use as a crop for green manuring. As most of you know the clover owes its value as a crop for green manuring largely to the fact that it is capable of taking from the atmosphere a very considerable portion of nitrogen which is one of the most expensive fertilisers to buy, but which may be obtained very cheaply in

this way. The pea belongs to the same class of plants and has similar powers in this respect, and we find that by growing a crop of peas say after the fall wheat has been taken off the ground, quite late in the season, they are very valuable indeed as a green manure to bury in the soil. By taking a piece of fallow land and sowing peas early in the season, plowing them under while in flower and sowing another crop, and later on plowing that under, we have found great benefit to the soil. In growing barley last season on a part of field which had been improved in this way, the barley was three or four inches higher and gave a much better crop. It is a more manageable crop than clover for this purpose as you can always be sure of the peas germinating no matter what the weather is. In England and Germany and France it is now quite common to sow such crops after the early crops have been harvested, not only for their value in storing up nitrogen and thus adding to the fertility of the soil, but also as a catch-crop to absorb what the rains later in the season bring down with them, especially the ammonia which has escaped from badly managed manure piles and decomposing substances. This is so soluble in water that if no provision is made to catch it it passes through the soil and out by drainage away to the streams. European farmers have found that by putting in these crops they serve to catch these elements of fertility which if they fell on a piece of bare ground would soak through, pass away and be lost to the farmer. So this particular crop has its advantages from several different points.

There is an element in the question of seed which must not be lost sight of. Many farmers forget that every seed of every variety they sow has an individuality just as thoroughly as we have our individuality, and these individual tendencies whatever they may be are perpetuated in the crop that we grow. If we take a lot of scrub cattle and try to raise good stock from them we should fail and we would not expect anything else, but it is often the case with a farmer who has a bin of oats that he cannot sell, he says, "Oh, they will do for seed," forgetting that he is using the poorest of his stock, and that he cannot expect under such circumstances to reap good results. One cannot be too careful in the selection of grain for seed, in seeing that the kernels are plump and well developed, and in every way fitted to fulfil their mission in the course of nature. Very often through unfavorable weather the grain grown for seed gets injured; sometimes a shower of rain interferes with its being put into the barn at the right time, sometimes it heats and this results in mustiness, when the germs are seriously injured. Injury also occurs from the action of frost, and from many other causes. We have every spring at Ottawa a series of tests as to the vitality of seed grain. Farmers all through the Dominion are invited to send any doubtful samples by mail to be tested. An ounce or even half an ounce is sufficient for the purpose. It is tested both in the soil and in folds of moist linen, and the percentage which will germinate ascertained. Any farmer can get this information without any cost, but he should send his samples in good season. I will give you the figures of the number of tests made in this way during the last five years: In 1886-7, 187; in 1887-8, 795; in 1888-9, 933; in 1889–90, 1,245; in 1890–1, 2,757; total in 5 years, 5,917.

This year, up to the present time, about 800 samples have been tested, although it is not long since the work was begun. It is often of value to a farmer who is going to sell seed grain to his neighbors to have it tested.

In regard to corn for winter dairying a number of experiments have been carried on for the last three years. In bulletin No. 12 we have given the results of all varieties tested, how far they may mature in the climate at Ottawa, which will be a fairly good guide for all the settled portions of Ontario and Quebec. The climate at Ottawa is not as favorable as in most parts of Ontario for maturing corn. We have found after a number of experiments that the Rural Thoroughbred White Flint is on the whole the best variety we have tested, and can I think be grown in any part of western Ontario and brought to that degree of perfection that will make excellent ensilage. In parts of the country where the season is shorter Mitchell's Early Flint is found to be the best variety. We have during the past year tested 69 varieties of corn, 27 of peas, 21 of beans, and 80 varieties of turnips, as well as 264 varieties of potatoes, making in all 765 varieties of agricultural products exclusive of carrots, mangels and other things. I suppose we should

be safe in putting the number of varieties down at eight or nine hundred of which accurate and careful accounts have been kept all through the season; date of sowing, date of seed germinating, weight of crop obtained, etc., and all this information has been preserved so that we are getting together a volume of valuable material for future guidance.

I desire to call your attention to the importance of allowing your corn grown for ensilage to reach that stage in its growth when it contains the largest proportion of nutriment. The following shows the results of four or five analyses made by the chemist of the farms of several different varieties:

Stage of growth.	Weight per acre.	Digestible matter per acre.
	Tons. lb.	lb.
Tasselling	22 1329	4220
Silking	24 58	5069
Early milk	22 1806	5873
Late milk	27 759	6012
Glazing	21 1154	7308

Digestible matter per ton at different stages of growth.

Date of cutting.	Albuminoids.	Fat.	Carbo-hydrates.	Fibre.	Total.
	lb.	lb.	lb.	lb.	lb.
August 26	26	3	144	77	250
September 19	27	5	176	90	298

There are still a few farmers who persist in sowing corn broadcast. This rarely ever gets beyond the stage of development known as tasselling, and the result is a watery crop with not much more than one-half the digestible matter there would be if the farmer contented himself with sowing a peck and a half per acre instead of three or four bushels.

A Voice.—Do you consider corn exhaustive to the soil?

Prof. Saunders.—Yes, it is to a considerable extent. I think an examination of the ash shows that it is not so exhaustive to the soil weight for weight as most other crops, but when you consider the very heavy crop it gives it does take from the soil a considerable portion of fertility. It is a general principle that the mineral ingredients taken from the soil and stored in the plant are taken up in the early and vigorous stage of growth of the plant, and they help the plant no doubt to assimilate from the air the necessary carbon and also in the formation of the sugar and starchy matter stored up in the process of growth. If the crop reaches that stage of development when the nutriment in the plant is very evenly stored all through the leaves and tissues it will have taken by that time from the soil almost all the mineral matter that it would take if you allowed it to remain to maturity. When corn reaches that stage the ears are formed and the kernels are in the soft condition, and after that nearly all the building up of the seed is a transfer from the leaves and stock of nutriment which has been stored there for that purpose. Hence, by cutting your crop when it is two-thirds ripe you do not in anyway save your land from exhaustion.

A Voice.—Does the transfer go on after it is cut?

Prof. Saunders.—Yes, and that is the reason why we find when grain is cut on the green side and stacked that in the course of two or three weeks it develops a plumpness

and brightness of kernel and a fulness that it will not have if you thresh it as you bring it in, for the reason that it takes nutriment from the straw as long as any circulation of sap is going on, and until the straw is thoroughly dry there is an advantage in leaving the grain unthreshed.

Several varieties of stock are kept on the Central Farm, among them the Quebec Jerseys. These cattle came, I believe, originally from Normandy, and there are districts of Quebec where no foreign blood has been introduced since they were brought here. The breed has been kept tolerably pure, and although these cattle are small they are the cattle upon which the Quebec people are building up their dairy trade, and as you heard from Professor Robertson yesterday the development of dairying in that province is greater than most of us are aware. We are experimenting with this breed of cattle in keeping some of the animals pure and crossing some of the cows with other breeds to see how they can be best improved.

Permit me to refer to the general plan of the dairy experimental work which is now being carried on under the guidance of the Dominion Dairy Commissioner, Prof. Robertson. This general plan covers the whole Dominion. Seven instructors were employed last season, who visited many of the more important cheese centres, and took with them the necessary appliances to enable them to give instructions in the best methods of carrying on this work. The instructors locate at a particular factory, and invite cheese makers and milk patrons to visit and discuss matters with them and get such information in connection with improved processes as they may be able to communicate. To further test the cheese made at such factories, samples have been sent to Ottawa to be cured and watched by the dairy inspector to see if he could discover any imperfections in their make so that advice might be given if needed. In this way we have cheeses from every part of the Dominion stored in the curing room of the dairy building at Ottawa, and undergoing frequent careful comparisons. The experiments at these cheese factories have been largely in two lines. One has been to determine the best proportion of rennet to use in cheese making. The proportions tried have varied from two parts to the thousand up to nine or ten parts. The results of these Prof. Robertson has given you. The other line of experiment has been to ascertain how far the proportion of butter-fat in the milk affects the quality of cheese made from it. The results of these tests have shown that the richer the milk the better the cheese, and that not only is the quality improved but the quantity also is increased. When you get milk containing between three and four per cent. of butter-fat, for every increase of three-tenths of fat there is an increase in the quantity of cheese made of three-tenths of a pound for every 100 lb. of milk, showing that it is judicious for the cheese factory to pay for milk in proportion to the butter-fat it contains.

Before closing I desire to refer to the experiments, in winter dairying in Western Ontario. Last week two hundred packages of creamery butter made at Mount Elgin and Woodstock were shipped to England, figuring up 12,000 lb. This went to Liverpool, Glasgow, Manchester and other points to be put on the markets there as an introduction of first quality creamery butter from Canada. Mr. Robertson has adopted a peculiar form of package, so that this in itself will help in future to sell the product if we only take care to keep up the quality. The plan adopted at Mount Elgin is as follows: The patrons bring their milk to the factory, and it is separated in the centrifugal separator in about half an hour or an hour, so that the farmer gets his skimmed milk back and takes it home again. The milk is regularly tested, and the proportion of butter-fat determined, so that every patron gets the full value of what he brings. It does not pay him to bring milk partly skimmed as he gets less for it. He only gets credit for what butter-fat he sends, and at the end of each month an advance is made to him of 15 cents a pound for the butter, three cents a pound is charged against the butter for the cost of making and marketing, and when marketed the balance is divided equally among the patrons in proportion to the amount of butter-fat they have contributed in their milk. In this way the patrons at Mount Elgin expect to get from 23 to 25 cents per lb. net for their butter without any of the trouble of making it. The separator separates about 10 per cent. more of the butter-fat than can be got by the most careful skimming. There is only about one-tenth of one per cent. left in the milk, and we may say that it

practically takes it all out ; so that if a farmer has 110 lb. of butter fat in his milk he can get it all by sending it to the creamery, while he would only get 100 lb. by working it up himself. I think it will be shown that it is largely to the advantage of farmers to combine in this way, and by association make their butter as they do their cheese, and that it will not be very long before we shall have creameries all over the country, cheese factories remodelled into creameries so as to serve for creameries in the winter and cheese factories in the summer, and by bringing a portion of the cows to calve in the autumn and having an abundant supply of milk at a time when butter can be made to the greatest advantage, and when it will command the highest price. By shipping this to foreign markets the farmers will get an advantage which will, it is believed, before long return them in the aggregate probably millions of dollars.

Mr. Best.—I would ask whether two kinds of grain sowed close together would not be impregnated by the bees and the wind to a certain extent.

Prof. Saunders.—No, sir ; it is not the case in regard to cereals. I believe myself that it can only take place through some accident where part of the spica has been taken away so as to expose the flora to the action of the pollen. I have not seen the slightest evidence of it taking place in the way you speak of. Growing side by side they all seem to maintain their purity no matter how close they are. Many mention that when these crosses are made artifically they create so great a disturbance in the ordinary course of nature that the hybrid does not seem to know how to accommodate itself to the changed conditions. This year from one variety we have separated 12 varieties. Some quite bearded, some beardless and other modifications in the form and character. By carefully selecting these varieties you can get the type fixed.

A Voice.—What prospects are there for fruit in Manitoba?

Prof. Saunders.—The results of trying to grow large fruits in Manitoba and the North-west are not by any means encouraging. I think it will settle down to this that Manitoba and the North-west will be a large grain growing and dairy country, and that they will import their supplies of fruit from Ontario and British Columbia.

A Voice.—Is it so that on the same stem there will be hard and soft wheat?

Prof. Saunders.—Yes, occasionally. I do not know why, we have all that to learn. It is impossible to suggest any remedy. It does not occur to any extent to interfere with the quality although it might grade it down one.

Moved by W. J. Sproule, seconded by George Island, That the hearty thanks of this Central Farmers' Institute be tendered to Prof. Saunders for the valuable paper prepared and read by him on "The advantages of the Experimental Farms to the farmers of the Dominion," and the all-important work they are carrying on at those farms. Carried.

ONTARIO AGRICULTURAL COLLEGE.

Mr. James Mills, M.A., President of the Ontario Agricultural College, read the following paper on "The advantages of a course of study at the Ontario Agricultural College to Farmers' Sons." I have spoken more or less at Farmers' Institutes for the last seven years—I have delivered a number of addresses on a variety of topics; but I have never yet said much about the advantages of a course of study at our College. I make no claims to exceptional modesty ; but I have a native and very strong repugnance to blowing our own trumpet, either directly by delivering addresses or indirectly by newspaper correspondence. I prefer to let our students and visitors tell what we are doing.

Hitherto I have not either spoken or written very much about College matters. I should perhaps have done more in this way; but I have been deterred by the thought that, in all lines of life, those who do most generally say least about it—that in agriculture, as in other things, the practice is very often in the inverse ratio to the preaching.

In this instance, however, your own Executive Committee selected the subject and requested me to deliver an address upon it. So you will please excuse me if I speak for a short time about what we are doing and trying to do at Guelph.

First of all, I may state that we have a farm of 550 acres, divided as follows: about 44 acres still uncleared; 63 acres in lawn, garden, nursery and forest tree plantations; 30 acres in small experimental plots; 60 acress in large experimental plots; lanes, etc. 10, and 343 worked as a farm proper and rough pasture.

On this farm we have large, commodious and fairly convenient farm buildings—not the best—but very good buildings.

We have also good samples, male and female, of nine breeds of cattle, eight breeds of sheep, and three breeds of pigs—all kept, not to make money, but for the purpose of instructing our students. We have Shorthorn, Hereford, Aberdeen-Angus, Galloway, Devon, Sussex, Ayrshire, Holstein and Jersey cattle; Shropshire, Southdown, Hampshire Down, Oxford Down, Suffolk, Leicester, Cotswold, and Horned-Dorset sheep; and Berkshire, Improved Yorkshire, and Tamworth pigs.

Every practical man knows that it would be the height of folly to keep so many breeds, if our primary aim were to make money; but we need them for the instruction of our students. The only way that a boy can get a practical knowledge of the different breeds of animals is by looking at them and handling them himself—by living among them so to speak. Hence we keep these 20 breeds of cattle, sheep, and pigs for the purpose of making our students intelligent and thoroughly practical stockmen.

Further, we have a well equipped dairy building with a competent professor and all the appliances necessary for giving practical instruction in the feeding of dairy cows, the handling of milk, the use of centrifugal separators and the Babcock milk-tester, the care of cream, the making of butter, the manufacture of cheese, and everything else pertaining to dairy husbanding. We have lately altered our dairy building and have made some additions to it, so that hereafter we shall have a class-room with elevated seats at one end looking into the butter-room, and a similar class-room at the opposite and looking into the cheese-room.

We have likewise a good chemical laboratory for practical work in that important department and a commodious botanical laboratory with a full set of new green-houses suitable for the most thorough and extensive work in botany and horticulture.

Having spoken thus briefly of our equipment for giving practical instruction on the farm, in the garden, in the dairy, and in our two laboratories, I may refer in a few words to our course and methods of instruction. The education which we give is under two heads: (1) A course of study and (2) a course of apprenticeship. We can teach most boys something about farming, but we freely admit that we cannot teach the details of practical agriculture so well as they can be taught upon a good Canadian farm. We have too many to give each one enough practice at anything to make him proficient in it. So we advise all intending applicants for admission to learn the routine of farm practice before coming to us. At the same time we require all our students to work in the outside departments—to take their turn at all kinds of work, rough and smooth, clean and dirty, on the farm, among the live stock, on the experimental plots, in the garden, on the lawn and in the dairy—for two reasons; (1) to enable them to pay their way in the college; (2) and more especially, to prevent them from acquiring a distaste to farm life and farm work while they are being educated.

We would like to get more educated young men to work on the farms of this country; and the question is how can we do it? We have a great university in this province with a first-class system of high schools, and they are doing an excellent work for the country, but they are not directly educating boys for the farm. It is true that

quite a number of boys go from the high school to the farm, but in ninety cases out of a hundred it is those who have been only a very or a comparatively short time at these schools. Let a boy of fair ability remain at a high school long enough to get such an education as these schools can give, and in more than ninety cases out of a hundred he will teach, preach, practice law, medicine or dentistry, peddle books, sell sewing machines, or do almost anything else, rather than go to work on the farm. This is certainly a misfortune; and I think it is no fault of the school or schools at which he is educated, for it seems to be the very nature of things that general education obtained apart from the manual occupations has a tendency to develop a distaste to such occupations. Hence we require all our students to work while they are being educated.

Our course of study is embraced under five heads :

(1) Agriculture, Live Stock and Dairying, with a short course of lectures on Forestry.

(2) Natural Science.—Chemistry, Geology, Botany, Natural History and Entomology, with instruction and practice in the use of the microscope.

(3) Veterinary Science.—The anatomy of common farm animals, the diseases and ailments to which they are subject, and the remedies.

(4) English Literature and Political Economy.—The principles, facts, and maxims of political economy; practice in English Composition; and the critical study of selections from several of the best authors in all the great periods of our literature.

(5) Mathematics and Book-keeping.—Arithmetic, Mensuration, Mechanics, Levelling, Elementary Surveying and Farm Book-keeping.

We emphasise particularly the department of agriculture, aiming first of all to make our students good practical farmers. We also make them first-class chemists, good botanists, and very fair veterinarians, while we endeavor to give them such a practical knowledge of English and mathematics as will enable them to discharge creditably the duties that will be required of them in church and state.

Especially we make our students proficient in live stock, by bringing cattle, sheep and horses regularly into the class-room and giving systematic object lessons in everything necessary to make expert judges of stock. Our terms of admission are the same as for admission to high schools and collegiate institutes. The cost varies according to circumstances. Every county in Ontario has the right to send one student every year free of tuition. For a student who receives a county nomination, the cost for board, washing and tuition will vary from $30 to $45 a year; and to an Ontario farmer's son who has to pay the tuition fee of $20 a year, the cost will vary from $50 to $65 a year for board, washing and tuition.

The advantages of our course are many, but especially the following :

(1) It furnishes just such theoretical and practical instruction as a farmer needs, embracing those branches of study which he requires and nothing else.

(2) It educates boys without giving them a distaste to farm life and farm work.

(3) It inspires boys with a love for agricultural pursuits and leads them to think more highly of farming as an occupation.

(4) It sharpens boys' wits, improves their manners, and in a large measure fits them for the duties that will be required of them in after life.

(5) It is thorough and very cheap—the cheapest education that is given anywhere on this continent or in the British Dominions, only $30 to $65 a year for board, washing and tuition.

I forgot to say that we have a reading-room supplied with general newspapers and all the leading papers and journals on general agriculture, stock-raising, dairying, poultry-raising, horticulture and general science; a library of between 5,000 and 6,000 volumes selected with reference to the wants of our students; and a large and varied collection of minerals, fossils and rock specimens for instruction in geology and soil formation.

In conclusion I may say that by observing our extensive experiments with varieties of grain, roots, corn, etc., our students learn how to do such work on a small scale for their own information and guidance.

Moved by Mr. Pettit, seconded by Mr. Kells, that the thanks of this institute be tendered Professor Mills for the very interesting and instructive address he has given us, and also desire to express our confidence in the work of the college. Carried.

The meeting then adjourned.

THURSDAY AFTERNOON SESSION.

The meeting resumed business at 2.30, the President in the chair.

PROTECTION OF SHEEP FROM DOGS.

The secretary, for Mr. D. Nicol, of Cataraqui, read the following paper on "For the protection of sheep from dogs, a more effective law is needed." The Act respecting the protection of sheep as last amended requires that every municipality shall annually levy a tax upon all dog owners, but at the same time it provides that upon a petition of twenty-five ratepayers of any municipality it shall be lawful for the council thereof to provide by by-law that the tax or any part of it shall not be levied in said municipality. No farmer who could raise sheep would sign a petition for such a provision, but in almost every municipality there is a small town or village containing enough dog owners to fill the petition, and this privilege, they very generally avail themselves of regardless of the interests of those engaged in sheep industry. A law so easily contravened is beneficial only in solitary instances. In municipalities where the law is kept in full force, the owners of sheep killed by dogs are allowed payment of two-thirds value for the killed sheep, there is no consideration for damage done to sheep that are not killed, but are rendered nearly worthless by being excessively chased. I know of many large flocks being ruined by dogs, while only a few of each flock were killed; hence for the actual damage done by dogs there is but comparatively small compensation.

I would not suggest any measure whereby individuals would be deprived of their right to keep dogs, but I am certain that if every dog owner was required to keep his dog or dogs chained or kenneled during nights, so that they could not kill or injure their neighbors' sheep, the agricultural community of Ontario would be relieved of the greatest hindrance to agricultural progress which it at present has to contend against.

A very serious question now presents itself, "Shall sheep or dogs prevail?" A very large proportion of the land throughout Eastern and Northern Ontario is peculiarly well adapted for sheep raising, and not very well adapted for any other purpose. Thousands of farmers on such land are barely making a livelihood, whereas if they could with safety from dogs engage in sheep husbandry, they could easily make more than a competency without the aid of hired labour. The damage actually done to sheep by dogs although very large in the aggregate, is as nothing compared with the loss to the country through the inability of farmers to engage in the sheep industry for want of protection from dogs.

Sheep raisers do not often suffer from sportsmen's dogs, because really valuable dogs are seldom allowed to run at large. By far the larger amount of damage is done by worthless mongrel curs owned by persons who possess very little if any other property. Now considering that the sheep industry is of infinitely more importance to the nation than the dog industry, it is surely not unreasonable to expect the Government to grant it a better measure of protection.

Even if dogs did not kill sheep, our country would not be less prosperous if their numbers were considerably diminished, while there is perhaps no way open at present whereby the nation's wealth could be so rapidly increased as by the adoption of sheep husbandry.

The "Farmers' Institute" is now a wonderful power in the land. One of the avowed objects of its members is to provide remedies for grievances. It certainly could check the aggravation of this common evil.

The discussion of this paper was postponed until after the reading of Mr. Mason's paper.

THE TORRENS SYSTEM OF LAND TRANSFER.

Mr. J. Herbert Mason, President of the Canada Land Law Amendment Association, then read the following paper on "The Torrens System of Land Transfer." In addressing a body composed of Ontario agriculturists on Land Transfer Reform it is unnecessary for me to say anything on the importance of the subject. In this country nearly every man owns the soil he cultivates, tenant farmers being the exception, and as a land owner, probably every one here present has had some transactions in land, and knows how desirable it is that the transfer of it from one man to another should be made as safely, simply, cheaply and expeditiously as possible.

Although conveyancing is generally regarded as a branch of the legal profession, not being myself a lawyer, I do not pretend to treat the subject from a professional or technical standpoint, but from the broader platform of a business man who has had extensive experience in land transactions, and exceptionally good opportunities for observing the practical operation of the system in force in this province.

For more than forty years it has been my fortune to be intimately associated with institutions whose function it is to advance money to owners of real estate requiring additional capital, in towns and cities as well as in the country. Questions relating to land tenure, land titles and land transfer are, therefore, to me matters of daily experience.

There are five systems of land transfer now in operation in Canada, namely: 1st. That under the Civil Code, which obtains in the province of Quebec. 2nd. The system provided in Queen Anne's reign for the east riding of the county of York in England, and imported into America by the early settlers; which still prevails throughout the United States, as well as in Nova Scotia, New Brunswick and the Island of Prince Edward. 3. The Ontario system, in force throughout this province, which was the one adopted for Manitoba and the North-west territories when they became part of the Dominion. 4th. The British Columbia system which is a modification of the Torrens system; and 5th. The Torrens system proper, which is in operation side by side with the old Ontario system in the city of Toronto and county of York, and also in the outlying districts which comprise more than one-half the territorial area of Ontario. It is similarly in force throughout Manitoba and the territories of Assiniboia, Saskatchewan and Alberta. Consequently about one-half of surveyed Canadian territory is now, or when patented will be under the system of land transfer originated by Sir Robert Torrens, and first introduced into Australia by him in 1858, and introduced into Canada in 1885.

Under the old systems of land transfer, the title passes on execution of the deed. Under the Torrens system the title passes only by registration. Conveyance by deed and conveyance by registration is the essential difference between the Torrens and all other systems.

The Ontario System.

Under the Ontario system of transfer by deed, a record is kept in the registry office of each parcel or lot of land, and on this record or index book are entered any documents presented for registration which relate, or are supposed to relate, to that particular piece of property. As to what their effect may be the registrar assumes no responsibility. Such documents are usually made out in duplicate—one copy being filed and also copied in the registry office, the other being retained by the owner or mortagee. Any one wishing to investigate the title to a piece of land may examine the records, or may obtain, by paying for it, what is called an "Abstract of Title," which is, or should

be, a copy of the index book in the registry office, and purports to contain a list of all registered documents supposed to affect the piece of land described at the head of the paper. He is also expected to examine the documents themselves, or certified copies of them.

Some abstracts are very long, containing hundreds of entries; such as those I now exhibit, but long or short they must be carefully and critically examined.

As a chain is no stronger than its weakest link, if one of these links is defective, or missing, the title fails as far as the records are concerned, and must be sustained by outside evidence, which after the lapse of years it is often difficult, and sometimes impossible to obtain. A link may be missing in the registry office, owing to the title having been acquired by possession, by heirship, or by devise; for one of the anomalies of the system is, that while a will may be recorded in the lifetime of the maker, and while it is therefore inoperative, a will may be actually in force and not be registered on the land affected by it. As a matter of fact many are not.

Few unprofessional men have any idea of the research and study required to make a competent land conveyancer, or of the many volumes of Acts of Parliament, judicial decisions, prescriptive rights, and precedents which have to be hunted up, examined and mastered. Lawyers who have devoted the greater part of their lives to this branch of practice, will tell you that new points are often arising, and that they always find something to learn.

Would such a system be endured if it applied to personal property? Let us suppose that every purchaser of registered government, or municipal bonds, bank stock, or any of the vast railway, mining, shipping, land mortgage, or other corporate interests, the outcome of modern civilization, was required to examine the chain of title from the first issue to the present ostensible owner, to see that every previous transfer has been legally drawn, and legally executed, by the proper parties, that it contained this particular property, and that other transfers recorded on the same page and mixed up with them did not; that each previous owner was of age; that he was unmarried, or if married, that his wife was twenty-one years of age and joined in the transfer; that if a previous owner died intestate, all his heirs joined in the transfer, that all were of age and unmarried, or if married, that their wives or husbands were of age, and joined; that the taxes levied on the owner were paid, and further that for several years at least, the sheriff had held no writs of execution against any of the owners; what, if all this were necessary, would be the effect on the saleability of such property? Ready convertibility, and certainty of ownership, being important elements in determining the worth of any investment, it is manifest that the effect would be to detract materially from its marketable value. Yet this troublesome, expensive, and time-consuming procedure, has to be undertaken at every transfer of real estate, no matter of how small extent, or of how little value.

The contingencies I have enumerated are only a few of those that beset the path of the unwary purchaser. The fact that the presumptive owners of real property are not oftener disturbed in their possession of it, and that the great majority of them have what are called good holding titles, is more from the absence of fraudulent intent, and the generally honest and simple character of transactions in land, than from any protection which the present system of land transfer affords. Still litigation on questions of title is not infrequent, and cases of extreme hardship have occurred and are occurring. If time permitted I might relate many of them. A very few will suffice:

1. On examining an official abstract of title to a certain piece of land, it appeared that one of the deeds had been executed, not by the owner in person, but for him, under a power of attorney, which was produced, and was in proper form. The proceeding seemed to be quite regular; but the careful solicitor, who was investigating the title, asked for proof that the power of attorney was in force, at the time the deed under it was made. This was regarded as an unnecessary particularity on his part; but being insisted on, search was made, and at length a tombstone was found in an English churchyard, the inscription on which showed that the person who gave the power of attorney was dead when the deed in question was executed. As the power had thus lapsed, the

title was still in the heirs of the deceased, who were not aware of the disposition that had been made of their property, and were not bound by it. The person who appeared on registry as the owner, who had paid for, and was in possession of the land, had no title to it.

2. There was a case of Nex. *v.* Seddon before Mr. Justice Robertson a few months ago. The action was brought to enforce a contract for the sale of a parcel of land. In this action it appeared that the vendor had a good registered title—no links in the chain were wanting, no flaws apparent. It appeared that the vendor claimed as devisee under his uncle's will, and had effected loans on the property. Now very few persons would guess what was the objection to this title. The will under which the vendor claimed was in due form, duly executed, duly registered, and yet *it was of no more value than a piece of waste paper.* The difficulty was that after the testator had made his will, he married, which had the effect of revoking the will, (see R.S.O., chap. 109, sec. 20), so that it was absolutely null and void ; and yet, it was nevertheless registered.

3. There was another case not long ago before the Ontario Courts of Munsie *v.* Lindsay (1 Ont. Repts., 164 ; 11 Ont. Repts., 520), in which the facts were as follows : In 1854 a man named Munsie died leaving a will whereby he devised his farm to his widow for her life, and then after her death to his son Robert. The will was duly registered. Robert shortly afterwards purchased his mother's life-interest, and then thinking himself owner of the lot absolutely, he sold it to his brother James, who subsequently sold it to the defendant Lindsay, who bought on the faith of his vendor having a good registered title. Lindsay lived on the lot and worked and improved it for a good many years, thinking, no doubt, to leave it as a provision for his family on his death. In 1874, however, the widow of the testator died, and within ten years afterwards, that is thirty years after Munsie died, the heirs at law instituted a suit against Lindsay and recovered the land from him, on the ground that the devise to Robert was void, he happening to have been a witness to the will. All the hard earned fruits of Lindsay's labor were thus taken from him, without any compensation, except a lien for the value of the permanent improvements he had made ; against which was set off an occupation rent for the premises since the widow's death. I think you will agree that a registration system which leads to such results is, to say the least, not a very perfect or efficient one.

4. Take another instance of its effects. Some little time ago a case was before the Courts, Beaty *v.* Shaw (14 Ont. Appeal Reports 600), in which the following facts appeared : There were two persons, executors and trustees of an estate. One of the trustees owed a sum of money to the estate, and executed a mortgage on a parcel of land to his co-trustee to secure its payment. The co-trustee died, and the other who owed the money survived him, and he then (without paying the debt to the trust estate) as surviving trustee and executor, dishonestly executed a discharge of his mortgage, which was duly registered. He then sold the land to the defendants in the action, who bought it in good faith, relying on the mortgage having been discharged. The purchasers worked it and made valuable improvements on it, and were somewhat astonished after the lapse of two years to learn that the discharge of mortgage was utterly worthless. The result of the suit was to take the land away from them, with all their improvements, without any compensation whatever ; and yet you will observe that the discharge, or what purported to be a discharge, was duly registered.

5. The following instance shows how even a most skilful lawyer may be deceived : A learned Queen's Counsel of Toronto, a shrewd business man, bought a parcel of land. He carefully searched the title and found it all right, the registry office disclosed no incumbrances. He paid his purchase money and was somewhat surprised afterwards, on being called on to pay $1,500 on a mortgage. This mortgage, it appeared, had been made on the land the gentleman had purchased, and other lands, and duly registered, but, by mistake, the registrar had omitted to index it against the lot purchased. The only redress was a right of action against his vendor and the registrar, but as both of them were worthless, the purchaser had to pay the mortgage and lose his money, and look as pleasant as possible under the circumstances. (See Lawrie *v.* Rathbun, 38 U. C. Q. B. 255, a similar case.)

6. In the recent case of Marsh *v.* Webb recorded in the Ontario Law Reports it appears that the deed which gave rise to the suit was made forty years before, and the defendants were dispossessed of the property they supposed was theirs, because all the parties to the transaction being dead, they were unable to prove the circumstances under which the deed made forty years before was executed.

7. Even our courts of law are sometimes not agreed as what constitutes a good title to land. In two cases recently before the courts where the same point was raised the decision of the Queen's Bench was exactly opposite to that of the Common Pleas. Until an appeal be made to the highest court, no one therefore knows what the law on the subject is, and properties held under similar titles will be unsaleable.

If such cases as the foregoing may arise where titles have been investigated and approved by learned professional conveyancers, what must be the risk incurred by those, who to avoid expense, purchase property and accept the title of the seller without any, or with only a very imperfect examination? And we all know that this is not unfrequently done.

Costliness of the Present System.

The excessive cost of administering the present system forms another count in our indictment of it. To carry it on no less than sixty-three registry offices are maintained in this province, the whole expense of which is borne by the owners of land. We find under the Torrens System one registry office is all that is required for each of the great Australian colonies. Four are all that are required for all Manitoba. Under the Torrens System a man has his certificate, which is indefeasible evidence of his title at the date of issue, in his own possession, and it is therefore unnecessary for the purchaser to visit the registry office to investigate the validity of previous conveyances. If that system were in force, by grouping counties together less than one-tenth of the present number of registry offices would suffice. It has been estimated that altogether nearly one million dollars a year would be saved by the land owners in this province were the Torrens System exclusively in force, and worked as simply and as economically as it might be. Such, gentlemen, are some of the features of our present system of Land Transfer.

To the ordinary mind there seems no good reason why all this cumbrous machinery and this expense and uncertainty should be inflicted upon owners of land; why, in fact, land may not be transferred from one man to another as readily as other kinds of property. Why should Mr. Vanderbilt or Baron Rothschild be able to transfer, or acquire stocks or bonds amounting, it may be, to millions, in a few minutes and without expense, while if you or I wish to purchase a small piece of the earth's surface, valued it may be at a few hundred dollars, we must, to be safe, go to a professional gentleman who, after spending days or perhaps weeks in patient investigation and hunting up evidence as to the title of the seller, is only able to give a doubtful and qualified certificate. Yet this often happens.

We are now informed, on the best legal authority, that there is no necessity whatever for this great difference between the mode of transferring land and other property; that the difficulties of transferring land are of human invention, originating in feudal times, when the few who held lands thought only of retaining it in their own families, and perpetuated by the ingenuity of law makers and professional conveyancers; that there is no reason why land may not be conveyed by a simple process of registration, similar to the way ships are transferred, and with as little circumlocution as is used in transferring stocks or registered bonds.

The Torrens System.

Before saying what the Torrens System is intended to do let us first see what it does not do. It does not pretend merely to record the fact that a deed or instrument has been made; and it does not permit to be registered instruments affecting the title, which are in fact of no more legal effect than mere waste paper, as we have seen that our present system of registry does. What the Torrens System aims at doing, and actually does, is

to record the title, *i.e.*, the legal effect of all instruments affecting the land. In order to bring property under this system it is necessary that the title of the person claiming to be first registered as owner should be investigated by a public officer; the title having been proved to his satisfaction, it is then registered—not the string of deeds under which the owner claims, but *the fact that the person who has thus established his title is the owner of the property;* and if his title is subject to any qualifications, mortgages or otherwise, these are also specially stated in the register.

If you want, therefore, to ascertain the state of a title registered under the Torrens System, instead of having to search through a long list of deeds, as under our present registry system, you can examine the register, or you are shown an official certificate on which is set out distinctly who is the present owner, and what charges, if any, affect his title. This certificate is a copy of the register, and after ascertaining from the registery office that nothing affecting the title has been lodged since the date of the certificate, you have all the information which it is necessary for you to know, in order safely to deal with the person claiming to be the owner. Moreover, under the Torrens system, you run no risks as to the title; the risk and responsibility of determining the legal effect of instruments affecting the title is settled at the time by the public officer; because no devolution of the title can be recorded until he is first satisfied of the legal validity and sufficiency of the instrument by which it is effected. These questions he settles at the time each transfer is made, and even should he by chance make a mistake, a rare and improbable contingency, persons who would otherwise suffer are guaranteed compensation for any loss occasioned by the mistake.

The results of the Torrens System, therefore, are certainty of title, expedition in shewing title, the avoidance of the great expense and loss of time attending the investigation of titles under the old system, and a guarantee against loss arising through mistakes.

Obstructions to the Adoption of the Torrens System.

If the Torrens System secures these advantages, the question arises, why are not the owners of land throughout Ontario given the benefit of it? Why keep to old and condemned methods when better are available, and are in operation elsewhere? In attempting to answer these questions I may say that while there may be some minor difficulties, the principal hindrances appear to be the following:

(1) The opposition of many existing and prospective holders of offices whose emoluments will be affected by the proposed change, as well as of their friends and patrons. This is not unnatural, nor should it be unexpected. Unfortunately most great general reforms and improved methods are calculated to interfere with existing individual interests, whose hostility has to be met and overcome—sometimes by suitable compensation.

(2) The indifference and more or less pronounced antagonism of a large proportion of the legal profession, who exercise so controlling an influence on legislation of this character, as well as on public opinion regarding it. The general attitude of that learned body may be epitomised in the words of a member of it, with whom I was conversing on the subject a short time ago. Said he, "Personally I am in favor of the Torrens System, professionally I am against it." To this general classification, however, there are some notable exceptions, as will be seen further on.

(3) Third and last, but not least, is the apathy, arising no doubt from lack of information on the subject, which is displayed by the owners of lands themselves. They, or at least many of them, know by experience the evils of the present complex system; that transactions in land are attended with expense, delay and uncertainty, but they do not yet appear to recognize the fact that a better system is available whenever they unite in demanding it.

The members of the Land Law Amendment Association who, besides having introduced the Torrens System into Canada, have already secured some other important reforms advocate the view that it is the duty of the Ontario Legislature to so extend the

operation of the Land Titles Act, that without further delay and with the least possible trouble and expense, the advantages of the new system may be placed within the reach of the people throughout the province.

The land was originally public property, was with its valuable timber, mineral and other natural products sold by the Government and the proceeds applied to public purposes.

The system of transfer which the general government provided, having been found defective and a better one being attainable, we hold that the Legislature should see that every facility be furnished to land owners to place their property under it. When a movement in this direction is proposed, some honorable members turn up their eyes in holy horror at the expense attending it, which expense is not attributable to the new system, but to the defects in the old one. But what would be the expense of half a dozen land title offices, such as is maintained in Toronto, compared with the great permanent benefits that will result? Or what is it when compared to the cost of abolishing seigniorial tenure, another relic of the dark ages, in Lower Canada? If millions may be spent in providing a legislative hall and government offices suitable to the dignity of this great province, surely a few thousands may be appropriated for the purpose of removing a grievous burden from the owners of the soil; who by their numbers and the permanent stake they have in the country constitute the best part of its population.

The administration of the new system soon becomes self-sustaining. The cost of establishing the Land Titles Office for the city of Toronto was first assumed by the Government. The officers are paid by salary, not by fees. The annual receipts considerably exceed the disbursements, and the Government has already received back a large portion of the money originally advanced. Why may not the same plan be followed elsewhere?

But, gentlemen, this great law reform cannot be accomplished without the assistance of members of the legal profession. After long discussion and full consideration the Torrens System was approved and adopted for the great North-west territories by such leaders in the profession as Sir John A. Macdonald, Mr. D'Alton McCarthy, Hon. Edward Blake and Sir Alexander Campbell, in the Dominion Parliament. In Manitoba it was championed by the Hon. Mr. Norquay, the Premier, who was not a lawyer, but was ably assisted by Judge Ardagh, Mr. John S. Ewart, Q.C., and Mr. J. A. M. Aikins, Q.C. In Ontario it has been advocated by the Hon. Oliver Mowat and Judge Ermatinger in the Legislature, and more than all by Mr. George S. Holmested, Inspector of Titles for the High Court of Justice, Mr. Beverly Jones and Mr. Herbert C. Jones, all members of the profession. To the latter three gentlemen Canada owes a debt of gratitude for being the first to make us acquainted with the Torrens System, and then for preparing the voluminous Acts of Parliament required to bring it into operation. Other distinguished members of the legal profession have also given the Torrens System their countenance and support, and many more will no doubt do so when the demand for the reform becomes more general and earnest.

But while cheerfully making these acknowledgments there is no disguising the fact that the average members of the profession give the Torrens System no support. They believe the movement is unfriendly to professional interests. The fees derived from conveyancing is materially lessened. The occasions for resorting to legal advice will be fewer. Litigation resulting from the present system will come to an end. This is admitted. But while these will be the ultimate results, the immediate effect of the change will cause an increase of professional as well as of official business.

So complicated are existing titles that in most, if not in all cases, legal assistance is required to get them into such shape as will warrant the issue of a Torrens certificate, and in every case abstracts and other evidences of title have to be procured from the Registrar, Sheriff and Treasurer's offices, so that the majority of the present generation of the classes supposed to be injuriously affected have little or nothing to fear as far as they are personally concerned. Still this is a people's, and more especially a land owner's question, not the owners of farming lands only, but of city, town and village property also. If they are apathetic they can hardly expect those who have no interest in it to be

active in promoting it. If they are in earnest and unite in demanding from their representatives in the Legislature the establishment of the Torrens System throughout Ontario, there is no reason why a measure for that purpose should not be carried in the next session. We have the example of Manitoba and the North-west Territories, and without going so far we see how easily it was done for Toronto and the County of York, and in Muskoka, Algoma and the other outlying districts. The same can, and we think should, be done for the rest of the province. But it should also be insisted that the system shall be carried on as simply and with as little red tape and formality as possible, that no complications shall be allowed to creep in, that the tariff of fees charged shall be no more than is required to pay for the efficient discharge of the duties of the Registry or Land Titles Offices, and that the contributions to the guarantee fund shall be reduced, and shall only be charged when a guarantee certificate is issued.

In asking that every possible facility shall be afforded for bringing property under the new system, it should not be assumed that the Legislature and Government are asked to confer a favor, but to discharge a duty—in fact a debt—to the original patentees and their successors. The people of Ontario are entitled to have, and sooner or later will have, the best system that is known ; and as by lapse of time, and the increasing number of transactions, titles are every day becoming more complicated, the sooner it is introduced and generally adopted the better.

I thank you, gentlemen, for the patient hearing you have given me. In accepting the invitation of your directors to address you, I intimated that I had very little to advance that is new, the subject having been already pretty well threshed out. If I have succeeded in convincing any who were heretofore in doubt of the necessity for and the practicability of the proposed reform I shall be well satisfied.

Mr. Good.—Can I get my land transferred to the Torrens System without selling it to any other person ?

Mr. Mason.—Certainly, if the Torrens System extends to the county where your land is.

Moved by A. H. Pettit, seconded by T. Lloyd Jones, That the thanks of this meeting be tendered to Mr. J. Herbert Mason for his very able and instructive address on the Torrens System of land transfer. Carried by a standing vote.

Moved by Mr. Good, seconded by Mr. Clarkson, that in the opinion of this meeting it would be very advantageous to the land owners of the province if the Torrens System was extended so as to embrace the whole of Ontario, and that this resolution be laid on the table for one year and be considered at our next annual meeting, with instructions to the subordinate institutes that in the meantime they discuss the question at their meetings, and instruct their delegates how to act.

Moved in amendment by Mr. Stutt, seconded by Mr. Ewing, That the Executive Committee of this Institute be a committee to investigate the Torrens System and report at the next meeting. The amendment was lost and the motion carried.

MODE OF ELECTING OFFICERS.

Moved by Mr. Clarkson, seconded by Mr. Good, that the election of officers of this Institute be held at the morning session of the second day of the meeting, and shall be by ballot. The election of the President, Vice-President, Secretary, Treasurer and auditors to be by a majority of the votes of the delegates assembled, and the members of the Executive Committee to be chosen by a majority of the delegates present from the districts they represent.

Moved in amendment by Major Walker, seconded by Mr. Lee, that the election of officers of the Central Institute for next year be by open vote to take place on the second

day of meeting at 10 a.m. session ; that the appointment of the Executive Committee take place immediately after the election of officers, the delegates from each district to have the appointing or selecting of their own delegate to be placed on the executive committee.

It was decided to vote on this motion or amendment without discussion.

The amendment was lost and the original motion carried by a majority of one, viz : 37 in favor of open voting and 38 in favor of the ballot.

REPORT OF THE COMMITTEE UPON LEGISLATION.

Mr. MORDEN, Chairman of the Committee on Legislation read his report. He said: I will make a very brief explanation with regard to one thing, the present duty on pork up to 200 lb. is 3 cents per lb. and over 200 is 1½ cents per lb. The consequence is that lumbermen import American pork and use it to the exclusion of Canadian pork. The following reports were then read and voted on clause by clause.

Your Committee on Legislation beg leave to make this their first report.

1. That the communication of the Dufferin Institute referring to the lien note system and to a final audit of municipal accounts before the end of each year has come before us. We would suggest that the promoters of these proposed changes be heard before any recommendations are made. Carried.

2. The Welland County Farmers' Institute suggests that the Ontario Legislature so amend the Tree Planting Act as to include within its provisions trees planted within eight feet of road fences upon either side thereof and also to permit the payment of a bonus upon trees which may stand nearer than 30 feet from now bonused trees.

We recommend the adoption of the above indicated amendments to the Tree Planting Act. Lost.

3. In respect to the resolution which followed Mr. Whelihan's paper.

We do not see that we can reeommend any different method of assessing farm lands which may be included within the bounds of what may be called urban corporations. We think that such lands should however be exempt from taxation for improvements which are confined to the thickly populated portions of the corporation.

We would therefore recommend legislation on this line similar to that indicated in the Bill introduced by Mr. Awrey at the last session of the Ontario Legislature. Carried.

All of which is respectfully submitted.

Moved by E. Morden, seconded by Alex. Servos, that the above report as amended be adopted. Carried.

Your committee on Legislation beg leave to make this their second report.

1. The suggestions of Charles Lawrence of the West Simcoe Institute have been considered. We do not see our way clear to recommend that assessments of property be only made at intervals of three or five years.

The suggestion that Municipal Taxes should be paid directly to the Treasurer has much to recommend, and we think that is a subject that might with profit be more fully discussed.

The same may be said of the suggestion to abolish Statute Labor.

Legislation that would give rural Municipal Councils the power to secure a three years' trial of the system in vogue in towns and villages would be a means advancing this reform.

2. That we have considered the petition of the Welland County Institute hereunto appended and we would recommend that Market Fees be abolished. Fees for services rendered as in weighing or measuring or for shelter provided need not be abolished.

3. We have considered the suggestion of Dawson Kennedy, of West Peterboro, and would recommend legislation that would make the taxation of dogs to apply to all of the municipalities of Ontario. The law as it now stands requires amendment otherwise, if the sheep industry is to continue with us.

4. We have considered the following resolution :

Moved by Chas. Mohr, seconded by E. Kidd, that in the opinion of this Institute a uniform duty of three cents per pound should be placed upon all grades of American pork entered for home consumption, and that the Secretary of this Central Farmers' Institute be and is hereby instructed to memorialise the Dominion Government to that effect.

As a matter of equity under our present tariff we recommend the passage of the above resolution.

E. Morden, Chairman.

Moved by E. Morden, seconded by William Collins, that the above report be adopted. Lost. Vote of 31 against to 22 for the report of the Committee.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

The following report of the Committee on the President's address was read.

Your committee to whom the address of the President was referred beg leave to report as follows :

We heartily endorse the sentiments expressed by our President regarding the rapid growth of the Institute in this Province and the beneficial influence it is exercising. He advises the farmers to imitate the example of the members of the Manufacturers' Association that when working for their own interests they forgot they were politicians. We heartily wish the members of the Farmers Institute could do the same.

We agree with the President that an extended market for the articles he enumerated would be desirable.

We also agree with our President that it is desirable that the farmers of Ontario should individually and collectively use every effort to make the display at the World's Fair in Chicago in 1893 worthy of the Province of Ontario, and we suggest that the Governments grant the necessary pecuniary assistance.

We your committee also very heartily recommend that the members of the Institute and the farmers of Ontario generally support and attend the picnic to be held in Grimsby next summer under the auspices of this Institute.

All of which is respectfully submitted.

Signed on behalf of the Committee, Roland W. Gregory, Chairman.

Moved by W. H. Phillips, seconded by Thomas Kells, that the following be added to the report now presented. That while we believe that it is the true policy of this country to seek an extension of our trade relations in all directions, yet we believe it is to our interests as farmers as well as our duty as Canadians, to consider the welfare of all sister interests. Because the interests of this country are so interwoven that we are in almost as large a degree dependent upon other interests for prosperity as they are upon us. Therefore while requiring an extension of trade relations we wish to place on record that our feeling is, that in trade matters no concessions should be made for which adequate compensation is not given.

The amendment was lost and the report adopted.

Moved by D. Kennedy, seconded by T. G. Raynor, that in the opinion of this Institute it would be of great benefit to this country if the subject of agriculture were placed on the programme of rural public schools, and we recommend that this matter be brought before the Minister of Education. Lost.

BARNS SUITABLE FOR THE AVERAGE FARMER.

Mr. Charles Lawrence then read the following paper on "barns suitable for the average farmer and how to get the best plan."

In preparing a short paper on barns and stables, it is of the greatest importance that we should have cheap, handy and comfortable stables, for the following reasons: first, as this is the age of advancement and our farm buildings have not kept pace with the improvement in farm machinery, and second, because we are about six months in the year feeding stock. It does appear very unreasonable that one man spends thousands of dollars in a building while another only spends hundreds, and at the same time in many cases the cheap stable is much more convenient. If we are six months in the year feeding stock, one man takes all day and works hard, another man feeds the same amount of stock in one half the time, with little or no hard work. Suppose that we have raised stock for twenty years, ten years of that time we will be feeding the animals, working hard from morning till night; another who has his barns handy will do it in one half of the time with comfort and ease. That will be five years hard work for nothing. No wonder Johnny left the farm.

The first thing a farmer should do in building a barn is to get up a plan so that the upper story will work in with the lower one, and every time feed is moved it will move nearer home. Have it so arranged that it will make it extra hard work to move it in any other direction. For instance have your straw cutter placed over your feed room so that the chaff will drop down into it, and at the time of threshing have the straw all to move toward the cutting box; next have your meal coming down a spout from a grinder above driven by a windmill, this power will drive the cutting box and grinding stone, pump water, elevate the grain, etc. Again suppose your stable holds 50 head of cattle, have it so arranged that instead of feeding with a basket where you would have to make twenty-five trips, you have a feed cart and do it all in two trips with more ease. Then again have your root cellar on a level with your stable floor, take your cart, and one or two trips will do, instead of carrying them in a basket which is very hard work, and enough to make a boy think of leaving the farm. Now comes the cleaning out of the stable with a wheel-barrow from 50 large cattle and fed plenty of turnips. I do not think there is a man here who would not be glad when he would be done; but instead of the wheel-barrow take a flat boat and a horse and in one or two loads all the manure is out with little or no hard work. This is what suits the times.

Next have your feed box convenient to the feed room, meal spout, root cellar and water hose, so that the whole feed can be mixed together without taking two steps; this is where the profit and ease comes in. Then have a steamer in the summer kitchen and convey the steam into the feed box in stable. This will prevent any danger from fire near the barns. Another very convenient arrangement is to have wainscoting behind your cows on stone wall in the shape of doors, so that they can be opened, and every time a door is opened you have a box stall. Have all of these and a few other things such as good light, cheap mangers and plenty of ventilation, and behold you will see the boys coming back to the farm. In the last place, how to get the best plans: I would suggest that the Agriculture and Arts Association give a prize for the cheapest and most convenient barn, suitable for the average farmer, the same as is given for the best farms, and then we would know where to go for a plan, instead of travelling all over the country as at present hunting up plans.

VOTES OF THANKS, ETC.

A vote of thanks was passed to the press for the reports of the meeting, and the railway companies for courtesies extended to the members of the Institute.

A vote of sympathy with Hon. John Carling in his illness, and of appreciation of his thoughtfulness in sending Prof. Robertson to take his place, was unanimously passed.

After a vote of thanks to the President and cheers for the Queen the Institute closed its session for this year.

SECRETARIES OF ELECTORAL DISTRICT FARMERS' INSTITUTES.

Electoral Districts.	Secretaries.	P. O. Address
Addington	J. B. Aylesworth	Newburgh.
Algoma, E	Fred Leighfield	Thessalon.
Algoma, C.	Frank W. Brown	Sault Ste. Marie.
Brant, N.	Alfred Smith	St. George.
Brant, S.	Thomas A. Good	Brantford.
Brockville	D. S. Mallory	Mallorytown.
Bruce, C.	William Bowes	Pinkerton.
Bruce, N.	John Douglass	Tara.
Bruce, S.	James A. Lamb	Walkerton.
Carleton	R. H. Grant	Hazledean.
Cornwall	C. W. Young	Cornwall.
Dufferin	George Island	Orangeville.
Dundas	G. D. Dixon	Dixon's Corners.
Durham, W.	Wesley Mountjoy	Blackstock.
Elgin, E.	J. C. Dance	Kingsmill.
Elgin, W.	Daniel Black	Iona Station.
Essex, N.	N. J. Clinton	Windsor.
Essex, S.	G. W. Coatsworth	Kingsville.
Frontenac	Alexander Ritchie	Inverary.
Glengarry	W. J. McNaughton	Lancaster.
Grenville, S.	W. H. Thompson	Prescott.
Grey, C.	J. I. Graham	Vandeleur.
Grey, N.	H. W. Jenkins	Owen Sound, Box 298.
Grey, S.	George Binnie	Bunessan.
Haldimand	Charles Walker	Cayuga.
Halton	A. W. Peart	Freeman.
Hastings, E.	John Stokes	Thomasburg.
Huron, E.	Arch. Hislop	Walton.
Huron, S.	John Hannah	Seaforth.
Huron, W.	William N Howell	Carlow.
Kent, E.	A. J. Campbell	Thamesville.
Kent, W.	Jno. Clarkson	Chatham.
Lambton, E.	Joseph Osborne	Wyoming.
Lambton, W.	W. S. Howell	Thornyhurst.
Lanark, N.	John Steele, jr	Almonte.
Lanark, S.	George Oliver	Perth.
Leeds, S.	Freeman Britton	Gananoque.
Leeds and Grenville, N.	Levi Patton	Oxford Mills.
Lennox	H. Aylesworth	Deseronto.
Lincoln	Roland W. Gregory	St. Catharines.
Middlesex, E.	Thomas Baty	Wilton Grove.
Middlesex, N.	S. P. Zavitz	Coldstream.
Middlesex, W.	A. McTaggart	Appin.
Monck	J. E. Cohoe	Wellandport.
Muskoka	Alex. Barron	Bracebridge.
Norfolk, N.	F. L. Culver	Waterford.
Norfolk, S.	Albert Gilbert	Simcoe.
Northumberland, E.	J. B. Ewing	Dartford.
Northumberland, W.	Richard Cullis	Camborne.
Ontario, N.	Thos. Allin	Greenbank.
Ontario, S.	Ellsworth Annis.	Oshawa.

SECRETARIES OF ELECTORAL DISTRICT FARMERS' INSTITUTES.

Electoral Districts.	Secretaries.	P. O. Address.
Oxford, N.	James Anderson	Strathallan.
Oxford, S.	M. S. Schell	Woodstock.
Parry Sound	D. Macfarlane.	Parry Sound.
Peel	F. J. Sleightholm	Humber.
Perth, N.	Wm. Keith	Listowel.
Perth, S.	P. S. Armstrong	St. Marys.
Peterborough, E.	John W. Clark	Norwood.
Peterborough, W.	John A. Davidson	Peterborough, Box 688.
Prescott	William McAdam	Vankleek Hill.
Prince Edward	Alfred S. Yarwood	Picton.
Renfrew, S.	Jas. McLachlan	Renfrew.
Russell	W. R. Craig	Russell.
Simcoe, C.	G. C. Caston	Craighurst.
Simcoe, E.	R. Miller	Hobart.
Simcoe, S.	H. B. Jeffs	Bond Head.
Simcoe, W.	W. A. Furlong	Nottawa.
Stormont	C. W. Young	Cornwall.
Victoria, E.	Wm. Thurston	Bobcaygeon.
Victoria, W.	James Keith	Lindsay.
Waterloo, N.	John F. McKay	Bloomingdale.
Waterloo, S	William Cowan	Galt.
Welland	E. Morden	Niagara Falls South.
Wellington, C.	George Wright	Elora.
Wellington, S.	P. Mahon	Aberfoyle.
Wellington, W.	James McEwing	Drayton.
Wentworth, N.	Joseph Stephenson	Freelton.
Wentworth, S.	Erland Lee	Stony Creek.
York, E.	J. C. Clark	Agincourt.
York, N.	A. E. Starr	Newmarket.
York, W.	R. L. Crawford	Richview.

ANNUAL REPORT

OF THE

CLERK OF FORESTRY

FOR THE

PROVINCE OF ONTARIO

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

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SEVENTH ANNUAL REPORT

OF THE

CLERK OF FORESTRY.

To the Honorable the Minister of Agriculture :

SIR,—I have the honor to present my Report on Forestry for the Province of Ontario for the year 1891, the leading features of which are :

A report on the condition of thirty-two counties and districts of Ontario as regards the amount and quality of the timber remaining, the steps taken, if any, with a view to reforestation or preservation of the woodlands, and the effect of over-clearance upon the climate and agricultural conditions.

An address on "The Value and Uses of Forests," delivered to the students of Upper Canada College, embracing the elementary principles of forestry.

An account of the process and results of the work of reforestation in France.

Papers on Forestry in the United States, the National Parks and the proposed Adirondack Park in New York State, giving an insight into the work undertaken by the American National and State Governments for maintaining park reservations in regions specially adapted for the purpose.

Extracts from prominent scientific authorities showing the influence of forests on climate.

An article on "Arbor Day in Schools," giving an account of the rise, progress and results of this beneficial observance.

A paper on Utilising Poor Farming Land, showing farmers and others the practical benefits of devoting to tree-planting land which is manifestly unsuited to profitable cultivation.

Extracts from a bulletin issued by Prof. E. B. Fernow, Chief of the Forestry Division of the U.S. Department of Agriculture, entitled "What is Forestry?"

A number of papers, partly original and partly selected, upon various phases of the subject of forestry and tree-planting.

It has been my aim to keep in touch with the most progressive and practical thought of the day on the science of forestry, and to present in a condensed form the best that is to be gathered, both from classic and contemporary literature bearing on the question.

The pamphlet is necessarily largely a compilation, as it would be impossible with the resources at my command to obtain such information at first hand.

Respectfully,

R. W. PHIPPS.

FORESTRY REPORT 1891.

FORESTRY CONDITIONS OF ONTARIO COUNTIES.

In the following paragraphs I have endeavored to lay before you the state of many of our settled counties in Ontario regarding their condition as to timbered land. Much of this information has been derived from actual observation, and the remainder from those supposed to be best aware of the condition of the country round them. In most of these counties it will be observed that the forest is being thinned out far too rapidly. Blocks of forest are being destroyed at a merely nominal value. Undoubtedly in many of the front townships farmers are planting long lines of trees, but these cannot give future timber. An isolated tree grows to branches. Throughout settled Ontario, if anything is to be done to preserve our timber resources it must be by the use of plantations, acres in extent. In these timber will grow in long, straight sticks, as in the primæval forest, fit for any use the farmer may desire. If he cannot in his heart allow a few of his acres to be devoted to that purpose, he will in a few years find himself utterly destitute of the wood he needs. Farmers are now in every direction purchasing at a distance lots for fuel.

In a great many cases the laying out of a plantation on the farm would not necessitate the withdrawal of any valuable agricultural land from cultivation. On many farms a portion of the land is so hilly, broken, or rocky as to be of little or no use. Tracts of this character are often allowed to lie waste when a comparatively little expenditure of labor and means employed in planting them with suitable kinds of timber would render them profitable, not only on account of the intrinsic value of the timber, but as a protection to the adjoining fields.

The testimony of old residents is practically unanimous as to the injurious effect of the clearing of the country on the streams and rivers. In all quarters the result has been the same. Heavy floods in the spring season, or after violent rainstorms, have often caused serious injury, carrying away in a few days the volume of water which would formerly have flowed off gradually and without injury. On the other hand, streams which formerly ran all the year round are now dried up during the summer months, and drouths are severely felt, and cause the farmer much loss and inconvenience. Had a due proportion of forest been maintained, especially on the higher grounds about the head-waters of the streams, these evils would have been greatly lessened, if not altogether averted.

There is also a general agreement of opinion among farmers in all parts of the province as to the benefits of the protection afforded by forests and windbreaks to the fall wheat and clover crops. The principal danger to which these crops are subject is the effects of alternate frost and thaw towards the end of winter or in early spring, by which the plants are lifted out of the ground and winter-killed. This generally takes place when the snow has been drifted off by the wind, leaving the soil exposed. Belts of timber to the windward of the crop—in most localities on the north or west side—intercept the wind and prevent the snow from drifting, so that crops thus sheltered stand a much better chance of survival than if the neighborhood were bare of trees. It has also been noticed in some districts that orchards thrive better and yield more fruit when sheltered from the wind in the same manner.

The planting of windbreaks to afford protection to the fields has only as yet been done to a limited extent, mainly in the older settled counties; but there is a decided advance of public opinion on the subject. Wherever the trees have attained sufficient growth to enable any conclusion to be drawn as to their utility, the farmers are fully satisfied with the result. As might be expected, there is much difference of opinion as to preferable

varieties of trees for this purpose, much depending upon the conditions of soil and locality, The principle, however, seems to be established that evergreens, if successfully grown. answer the purpose of a windbreak more effectually than deciduous trees, for the obvious reason that the latter are bare of foliage at the season when their protection is most needed.

As to the course which ought to be followed to maintain a proper proportion of timbered land, a great variety of suggestions, practical and otherwise, has been offered. The subject divides itself into two heads, viz., the plan to be pursued as regards unsettled land not fitted for agriculture, and the best methods of inducing farmers and land owners in the settled localities to plant or preserve timber on their own property. As to the first branch of the subject there is a strong and general feeling among intelligent residents of the back townships that greater precautions are needed for the prevention of bush fires, and that it would be advisable to withdraw from settlement large areas of land obviously unsuited for agriculture and maintain them permanently in timber, under proper forestry regulations, instead of allowing them to be stripped of all merchantable timber in a wasteful and improvident manner, and then abandoned as waste land.

With regard to encouraging tree planting among the farmers, one point which has been prominently brought out in the course of my enquiries is that some form of Government or municipal encouragement is necessary to induce farmers, as a class, to take an active interest in the matter. The Ontario Tree Planting Act has only been taken advantage of in a few localities. A proposal which has numerous advocates is that plantations, or land preserved in timber, should be exempted from taxation, a certain extent only being thus exempt in proportion to the total acreage held.

Brant.

The greater portion of the land of this county is well adapted for cultivation, there being few rocky or stony tracts. About fifty per cent. of the surface acreage is level, thirty-five per cent. undulating, and the remainder hilly. Probably about one-quarter of the total area would be more valuable to the owners if left wooded and carefully culled than as agricultural land. Not more than ten per cent. is now timbered, and that, as a rule, is not properly managed, and now contains little valuable timber. The leading varieties to be found are beech, hard and soft maple, elm, basswood and black ash. There is but little pine and white oak, or any other timber suitable for manufacturing left.

Many living springs and streams, once unfailing, have entirely disappeared, and the water supply is very uncertain. It is found necessary to dig wells much deeper than formerly to secure water for domestic purposes. Drouths have of late been severe. The absence of forests, which not merely acted as a reservoir of moisture but protected the farms from drying winds during the summer, has undoubtedly resulted in making the effects of drouths more injuriously felt, irrespective of any influence on the actual rainfall.

It has been found that wherever fields are sheltered by timber wheat and clover are very seldom winter-killed. The beneficial effect of forest protection has also been observed as regards other crops, and more especially orchards, which thrive far better when thus sheltered from the wind.

A few windbreaks, or rows of ornamental trees, have been planted with good results, the fir tree being principally used for this purpose. Nearly all the wood-lots are used for pasturing cattle, and in consequence much of the timber is dying out. Neglect of the growing timber is very general among the farmers.

Bruce.

About one-half of the county of Bruce is cleared land but the area yet in timber is being rapidly diminished, and unless some means are adopted to prevent the indiscriminate destruction of the woods, evils which have resulted in the older-settled counties

from this cause will repeat themselves here. The general character of the surface is rolling; the land is for the most part suited for cultivation, but some portions are rocky and sterile and might with advantage be reserved for forestry, as trees grow well in these parts.

The most numerously represented kinds of trees are the cedar, hemlock, basswood, maple, white and black ash. There are only a few pine left. The clearing of the country has not been sufficiently general to affect the streams and cause the alternate floods and drouths which are so noticeable a result in the older portions of the province. For the same reason there has been no appreciable amount of tree-planting, and it is difficult to induce the settlers to take any interest in the question or to realise the need of maintaining a due proportion of forest land. Practical experience has abundantly demonstrated the utility of the shelter afforded by the forest to the fall wheat and clover crop.

Carleton.

Only about five per cent. of timbered land remains in this county. The leading species of trees which are still to be found are elm, ash, beech, birch, cedar, tamarack, spruce, and some pine. The greater portion of the county is level, cultivable lands, but there are some stretches of flat rock unadapted either for agriculture or forestry.

The effect of the extensive deforestation of the country on rivers and streams has not been so noticeable here as in nearly all other localities. The most important climatic change which it has occasioned is that the severity of the wind in winter and early spring is felt to a greater degree. Since the disappearance of forest shelter the wind has in many places an unbroken sweep for miles, and the fields are consequently drifted bare of snow and the crops exposed to the severity of the frost. But little fall wheat is grown in the county.

There have been no windbreaks planted, and little interest is displayed by the farmers in the subject of forest preservation. The woods which still remain are fast diminishing. The practice of permitting cattle to find pasture in the wood lots to the great injury of the young trees is very generally pursued.

Dufferin.

With the exception of Melancthon and East Luther townships, which are still under the process of clearing for settlement, the proportion of timbered to cleared land in Dufferin does not much exceed five per cent. The leading varieties of trees remaining are tamarack, hemlock, spruce, cedar, maple, beech, elm, birch and ash. The land is level or slightly rolling, except in Mono and Mulmur townships, which are hilly and rough in places with sandy soil. These latter localities are well adapted for tree planting. They were formerly wooded, but have been cleared by the axe, followed by destructive bush fires.

A great change as regards water supply has been noted during late years. Many springs which previously were never known to fail have dried up, and the surface water passes away very quickly in the spring. Drouths during summer are much more prevalent since the forests disappeared.

The farmers have nearly altogether abandoned the growing of fall wheat in the higher portions of the county on account of its liability to be winter-killed for want of the protection of the timber. The advantage of planting either fall wheat or clover in a sheltered position is generally recognised. Windbreaks have been found beneficial, but as yet few have been planted. In one case a plantation of 4,800 young maples, occupying four acres, was made, with the result that only about three per cent. died, the remainder doing well and affording an appreciable protection to adjoining crops two years after setting out. Maple, elms, ash and basswood all do well as shade trees. For hedges or windbreaks cedar is easily grown and serves the purpose admirably.

A more stringent law against kindling fires in summer is needed to prevent destruction from this cause. It was suggested that municipalities should suitably encourage tree-planting by bonuses or otherwise, and that a portion of the time required for statute labor might be given to the work of tree-planting.

Dundas.

Probably about one-fifth of Dundas county is still covered with timber either of the original forest or second growth. Many of the farmers have retained a grove of maples as a sugar bush, and in some rocky places they have protected the young maple trees and have fine second growth groves. The other kinds of wood still to be found are soft ash, elm, soft maple, birch, tamarack, cedar, pine, balsam, bass, beech, rock elm, and a little spruce. The rock elm and basswood are being rapidly disposed of.

The land is mainly level and some slightly undulating; none of it can be fairly described as hilly. As a whole the soil is excellent for farming purposes, but there are a few small spots where the limestone rock comes to the surface, the most profitable use of which would be to keep them permanently in timber.

The water supply has been very seriously affected by the indiscriminate destruction of the forests. The result has been not only to dry up many small streams, but to threaten the larger ones with extinction. There has been a decided increase in floods, which, however, must be in some degree credited to the deepening of the shoals in the Nation river, and the opening out of the water-courses leading thereto, which draw off the surface water rapidly in the spring.

There have been very few windbreaks planted, but wherever it has been done the effect has been very satisfactory. In addition to affording shelter from the wind they provide a grateful shade from the heat of the summer sun and preserve coolness and moisture. The varieties mainly employed are hard and soft maple and evergreens. The soft maple is recommended as growing faster and thriving better than the others. This will probably be on low lands.

Fields of fall wheat and clover when protected from northerly winds by a belt of timber are not so likely to be winter-killed as those exposed to the wind and liable to be laid bare of snow and subjected to alternate freezing and thawing.

Much damage to the remaining timber has been caused by bush fires, and if a proper proportion of forest is to be preserved more care will have to be taken to prevent destruction from this cause. In the opinion of some residents much might be done to encourage replanting if the municipal councils could be induced to take advantage of the Provincial Government's offer of a bonus for trees planted along highways and boundary lines.

Elgin.

It is estimated that about one-third of the county of Elgin is still wooded land. The leading kinds of timber now found within its limits are beech, maple, elm, and ash, which are widely distributed over every part of the county. There is also a good deal of oak, hickory, chestnut, whitewood and basswood, and cherry, sycamore, butternut and black walnut in smaller quantities. In the eastern portion of the county there is a large quantity of pine.

The land is for the most part rolling, though about the centre of the county there is a good deal of level land, and the regions bordering on the lake to the south and on the river to the north is in some portions quite hilly. Though generally well suited to the plow, there are portions to the east and extreme west which could be more profitably devoted to forestry than to farming.

A marked increase in freshets in the spring and fall seasons and less water in the streams during the summer months have been the result of deforestation.

In November last the river Thames, which forms the northern boundary of the county, rose 24 feet in as many hours. At one place there can be seen the remains of three bridges, besides the present structure, and each shows that it was constructed about six feet higher than its predecessor, the last being fully twenty feet higher than the one constructed about forty years ago.

The ground becomes dry much earlier in the year in consequence of the absence of forest protection. The benefits of the shelter afforded to fall wheat crops is universally admitted ; the same fact has been observed in connection with the clover crop, though in a less degree. There is some difference of opinion among farmers as to the cause why these crops survive the winter better when sheltered by adjoining timber. Some claim that the forest is a direct protection to the plant, while others take the view that the only service it renders is in acting as a windbreak and preventing the snow from drifting.

A few windbreaks have been planted with good results. The trees principally employed are Norway spruce, pine and maple. Spruce are considered the best for the purpose, but the soft maple is a tree of quicker growth. There are a few rows of Lombardy poplars which make excellent windbreaks. Much destruction is caused by allowing cattle access to the bush as they eat away and break down the underbush and small trees.

Essex.

About one-fourth of this county, on a rough estimate, is still in timber, the principal kinds now to be found being black ash and soft maple. In some localities there are scrubby oaks, but all other merchantable timber has well nigh disappeared. The land is generally level and nearly all fit for farming purposes. Originally there was a good deal of marsh or waste land, but under the drainage system it has nearly all been brought under cultivation, and is well adapted either for agriculture or tree planting. Hitherto the planting of forest trees for windbreaks has practically been limited to the setting out of a few spruce or other ornamental trees about the houses and gardens.

As regards the experience of farmers as to the protection afforded crops by the shelter of adjacent forests, it has been noticed that a field of fall wheat grown alongside of a piece of woodland, especially when the shelter is on the west or north side or on both, shows in the spring-time the advantage of the protection received. It frequently happens that the portion of the crop sheltered by the timber survives in good condition while that occupying other portions of the same field were all winter-killed. The woods prevent the drifting of the snow by which the field would otherwise be left exposed to the full severity of the frost. If the farmers were to plant spruce trees as a substitute for fences it would not only improve the appearance of the farm, but act as a wind-break, and ensure a measure of protection to the crops. These trees can be set so closely together as to form a tight fence after a few years' growth, and in the meantime, if a close fence is required, a few wires can be run through them at small expense.

The principal climatic change noted in this locality is the lessening of the snow fall in volume during late years. The rains are not so regular as formerly, and as regards floods and drouths the seasons are very variable.

There is a disposition to favor Government encouragement to tree-planting in the form of a bonus to those who will plant a number of fast-growing kinds of trees each year. Another proposition is that it should be made obligatory on every farmer to lay out or maintain a portion of his farm as a wood-lot.

Glengarry.

Of this county probably about one-third is still under timber, the principal sorts being maple, birch, beech, basswood, rock elm, black elm, black ash, hemlock and some white pine. Cedar, tamarack, balsam and balm of Gilead are found in smaller quantities. There are some stretches of level land, but the general character of the surface is rolling. While the soil is generally good and suitable for agriculture there are some small stony areas which could more profitably be devoted to tree-planting.

As a result of deforestation the volume of water in the rivers and streams has been greatly reduced during the summer and fall. In many cases the smaller water-courses are completely dried up. In the spring the water is very high for a short season. Swamps and low-lying lands pour out into these streams in a week or two all the water which when covered with timber they formerly retained until midsummer.

Fall wheat and clover are not so extensively cultivated here as in the counties further west, these crops being regarded as uncertain owing to climatic conditions. The protection of the forest securing the more equal distribution of the snow fall has been found to be attended with favorable results. Within the last ten years some plantations and windbreaks have been set out, mostly on a small scale, and near the farm buildings. The kind of wood generally employed is the hard maple. These trees have so far thriven well, but the experiments are too recent to warrant drawing any decisive conclusions as to the result.

The general impression is that not much activity in replanting on a large scale can be expected among the farmers unless some inducement is held out to them by the Provincial Government or the municipalities to compensate them for the expense, either in the form of bonuses or exemptions from taxation.

Halton.

Maple, beech, oak and elm are the principal constituents of the scanty remaining woodlands of Halton county, which only comprise some five per cent. of the whole area. There is also a little pine and cedar left. The general surface of this county is slightly undulating The mountain range traverses it, but only a very small percentage of the area is suited for agricultural purposes. The heights and slopes of the mountain range could profitably be utilised for tree-planting. There has been a considerable increase of floods and drouths in consequence of the excessive clearance of the country, the water running away much more rapidly in spring-time than formerly, and the general flow of the streams at other times of the year being very much lessened.

Plantations either in mass or as windbreaks have only been made to a limited extent. But the experience of those who have made the trial has been so satisfactory, and the effects of the protection afforded so beneficial, that the farmers are becoming more alive to the advantages of the system, and it is probable that much greater improvements of this kind will be made in the near future. White pine has been found the best tree for the purpose of windbreaks, and Norway spruce has also answered very well. Willow has been tried, but has not answered so well. The protection of the forests has been a great benefit to grain and clover, and in fact to crops generally, not only in defending them from the effects of frost, but in retaining the moisture during the hot weather. Land situated near a forest or windbreak does not suffer in the summer time from the drying effect of the wind, as does that more exposed.

There is a growing feeling among the farmers in favor of the encouragement of tree-planting by government or municipal bonuses. A slight aid of this sort to partially compensate for the first cost of the undertaking would give a considerable impetus to this much needed improvement.

Hastings.

The characteristics of the front and rear portions of this county are widely different. The six front townships are nearly all good agricultural land, the soil being generally clay or light loam. About one-tenth of this section is still timbered with hardwood. The rear townships are hilly and rocky land, interspersed with small lakes. This section was largely timbered with pine, the most of which has been cut or swept by bush fires, leaving large areas of broken burned-over country entirely unavailable for farming purposes, and covered in parts with a second growth of poplar, white birch and other trees. The original forest yet remaining is mainly hemlock, spruce, balsam and hard woods. There are portions here and there adapted for cultivation.

A marked increase in the volume of the spring floods and a corresponding diminution in the summer flow of the Moira River which forms the principal outlet. During the last thirty-two years bridges over the river have been frequently carried away, and in the course of successive re-buildings and repairs it has been found necessary to raise them from four to five feet above their former level, notwithstanding which the upper bridge was seriously endangered by ice carried down by the spring flood of 1891. In ordinary summers during the last fifteen years the volume of the Moira has been reduced to that of an average spring creek, and during the latter portion of the summer of the same year the whole of its current would have passed through an eight-inch pipe with a head pressure of ten feet.

There has been no noticeable planting of windbreaks beyond the setting out of a few ornamental trees. It is the general experience of farmers here as elsewhere, that where fall wheat and clover fields are protected by forest to the west and north, the results are beneficial and there is little danger of destruction or injury by frost. The suggestion that each farmer should be compelled to keep a certain proportion of his land in forest meets with approval in some quarters.

So far as the northern portion of the county is concerned, the most pressing need is more stringent regulations as to starting fires. Some of the devastating fires that have swept the bush or partially cleared regions are attributed to the carelessness of miners, berry-pickers and hunters, who, it is thought, would be more under control of the Government fire-rangers if they were compelled to take out licenses before entering Crown lands.

In the settled parts much destruction is caused by pasturing cattle in the bush, which ruins the young trees.

Huron.

From eight to ten per cent. of the total area of Huron is wooded land but the timber throughout has been much culled for lumber and fuel, so that there is little, if any of the forest left in its original condition. About five per cent of the land is hilly, from ten to fifteen per cent. level or nearly so with some swampy flats, and the remainder rolling. The greater part of the soil is well suited for farming, about four-fifths of it being a clay loam with limestone and gravel sub-soil ; there is but very little rocky land. The varieties of wood yet remaining are principally soft elm, black ash, beech and maple. There is very little pine left, and some hemlock of an inferior description. The prevalence of soft elm is due to the fact that the most of the land left uncleared is low and swampy.

Since the wholesale clearance of the land drouths have been more frequent, and within the last few years there have been two or three severe floods, in particular one in August, 1887, which caused the streams to rise considerably above the usual height of the spring freshets. The want of rain in May and June has frequently caused a serious shortage in the hay crop and injured other crops.

Observation has shown that fall wheat and clover have been materially benefited by the neighborhood of forests. The young plants protected by the shelter of the woods are not so liable to be lifted out of the ground by the action of alternate frost and sunshine in the spring, as those growing in more exposed situations.

A few windbreaks have been planted, and in some cases a belt of timber has been left in clearing to answer the same purpose. This has been mostly done in the immediate neighborhood of farm buildings and orchards, and the effect has been beneficial. The trees usually left as windbreaks are maple, elm and basswood, but wherever evergreens such as Norway spruce and Canadian spruce have been planted they have thriven well, and are regarded as the best, being more efficient as winter wind-breaks than deciduous trees. The Canada fir balsam has not been found equal to the spruce, as the lower limbs die off in a few years leaving naked trunks. This is particularly the case where the trees are planted in clumps or thickets. Maples nearly always do well on good dry land.

The corporations of some towns and villages offer a bonus for tree-planting, and similar action by the Local Government in regard to rural districts would stimulate this much

needed movement. Another proposal which meets with approval is that a certain proportion of timber land on each farm, say from ten to twenty acres, should be exempt from taxation. In many cases the taxation of uncleared lands has forced the owners to clear them off, to defray the expense of holding them.

As an instance of what might be done could the farmers be aroused to the necessity of replacing the timber and convinced of the profitableness of tree-culture, it may be mentioned that a farmer some five years ago planted one bushel of walnuts. The result surpassed his expectations, and he has now about 1,200 young trees from eight to ten feet high, which have flourished without any manuring or cultivation. Much injury is done to the remaining patches of forest by cattle, as the farmers do not generally realise the necessity of excluding them from the bush in order to allow the saplings to grow up and replace the heavy timber when removed.

Kent.

The timber land of Kent is estimated at about twenty-five per cent. of the total area, but a good deal of the land that is not under cultivation has been denuded of the timber. The leading kinds of timber still extant are water elm, black ash, basswood, hickory, beech and maple. Oak and walnut were once plentiful, but no supplies of either of any consequence remain. These valuable woods were nearly all exported at a time when they only commanded a sufficient price to pay for the labor of cutting and marketing them. The recklessness and improvident disregard for the future with which these invaluable forest resources were exploited can now be realised when it is considered that oak that sold fifteen or twenty years ago at $4.50 per thousand feet could now be marketed at $25 per thousand, and walnut which then only brought $14 per thousand feet would to-day command $100.

The land throughout the county is very level, and available for either agriculture or tree planting, there being no localities specially adapted for the raising of timber by reason of their unsuitableness for cultivation. There has been little done in the way of tree-planting, the only improvements of this kind being the planting of rows of shade trees for ornamental effect rather than with a view to crop protection or the future supply of timber.

Owing, no doubt, to the flat character of the country the effect of deforestation in reducing the volume of the streams and inducing floods and drouths has not been so marked as in other places. While, as before remarked, there is no particular locality in the country which from its unfitness for agriculture, seems more specially marked out as an area for planting for profit, there is urgent need for encouraging the planting of windbreaks and belts of timber by the farmers.

Lambton.

The wooded portion of this county is about one fourth of its entire area. The surface of the land is principally level, but slightly rolling in some parts, and rather hilly towards the eastern boundary. It is nearly all cultivable. There is some sandy land on the lake shore, chiefly in Sarnia and Bosanquet, which was originally occupied by forests of white and black oak and, in places, good groves of white pine. Most of this timber has been cut down. This sandy area is of little or no use for any other purpose than tree-planting, but it would be difficult to insure the growth of trees at the outset. Probably the best tree for the purpose would be the yellow locust, to be raised from seed.

The principal kinds of native timber now to be found in the county are swamp elm, black ash, white ash, hard and soft maple, hickory, basswood, oak and beech. Cotton wood has sprung up on old clearings as second growth. But few windbreaks have been planted, and those on a small scale. Among trees introduced for shade or ornamental purposes are Norway maple, golden willow, Lombardy and silver poplar, European alder, Norway spruce, Austrian pine, Scotch fir and larch, all of which seem to endure the vigor of the climate well and grow vigorously. The Manitoba maple is a rapid grower and easily raised from seed.

The principal effect noticed in consequence of the clearing of the land has been the increased severity of drouth during the summer. Floods rarely prevail to such an extent as to do much damage, but the water drains away more rapidly in spring than formerly, and as a consequence the streams are somewhat reduced in volume.

The proportion of wooded to cleared land being still comparatively large the scarcity of wood is not felt as it is in some other counties, and consequently but little attention has been paid by the farmers to the subject of re-planting. The wood lots are as a rule much neglected by the farmers, the best trees being taken for fuel, etc., and nothing done to replace them. Much injury is caused by pasturing cattle in the bush. If care were taken to keep out cattle a good growth of young timber would spring up spontaneously, but more good could be effected by replanting with quick-growing and valuable timber, such as black walnut, hickory, ash, etc. If the provision of the law allowing land owners to plant trees along the roads bounding their farms were taken advantage of, and black walnut or other timber set out or sown, an appreciable addition would be made to the value of each farm.

LENNOX.

The process of denuding the soil has probably been carried as far in this county as any where in Ontario, only about five per cent. of the total area remaining in timber. The chief kinds of wood now to be found are maple, beech, cedar, balsam, elm and tamarack. The surface as a rule is rolling, and the soil varies from light limestone to sandy loam, rich vegetable mould and stiff clay. In the main it is good agricultural land, though there are portions better adapted to tree-planting.

The water supply has been materially affected by the destruction of the forest. The rivers sink much lower than formerly in the summer, and the small streams dry up altogether. Observations of old residents, extending over the last forty or forty-five years show a marked increase of floods and drouths, more particularly the latter.

Where windbreaks have been planted the effects have been good. One farmer, Mr. Allen Pringle, has planted during the past few years seven or eight hundred basswood and one hundred maple. He suggests the encouragement of planting by the Provincial government and municipalities, and also that as desirable trees for plantations and windbreaks are not within convenient reach of the people in many localities, the agricultural colleges and experimental farms should be devoted much more largely to the growth of such trees. Thus they would become the sources of supply at light expense to those willing to plant.

LINCOLN.

As is the case in most of the frontier counties, the proportion of timbered land yet remaining is very small, probably not more than five per cent. The general quality of the soil is good, ranging from light sand to black loam and heavy clay, the land being well adapted for fruit growing and farming. The county is crossed from east to west by the escarpment known as the mountain, from which descend numerous streams which find their outlet in Lake Ontario, and cut deep gorges in the hillside and rising ground, otherwise the land is level. The hills and gorges are better adapted to forestry purposes than to agriculture, while the mountain bluff facing the north is entirely unsuited for any form of tillage, being rocky, so that forestry is the only profitable use to which it is adapted. The timber yet remaining in the county is chestnut, beech, basswood, maple, oak, pine, white elm, black and white ash and whitewood.

The effect of the clearing of the timber has been very decided. Streams which formerly ran the year round almost entirely dry up during the summer, with the exception of the ponds which have been formed near the lake. There are frequent floods in the springtime, and drouths are at times severe. The extensive planting of fruit trees may have had a beneficial effect in mitigating these evils. There have been so few plantations of forest trees or windbreaks that it is difficult to obtain data for an opinion as to the effect upon agriculture. Where wind breaks have been planted spruce and willow have been put in, the former being usually preferred.

Where fall wheat and clover crops have had the protection of timber remaining, in the immediate neighborhood the result has been beneficial. Among the suggestions received from farmers and others interested in the restoration of the forest in suitable localities, is the exemption from taxation of forest land under such conditions as might be thought advisable to prevent any abuse of the privilege and ensure good faith.

Middlesex.

The proportion of land remaining under timber in Middlesex is about fifteen per cent. The soil was originally heavily wooded with numerous varieties of trees principally hardwood. Very little pine, cedar or hemlock has been left, the kinds remaining being chiefly maple, beech, oak, elm and ash. The surface of the land is largely rolling, with a small proportion hilly or rocky to such a degree that it is unfit for profitable cultivation. The level and undulating portions are excellent soil, being chiefly clay loam and in some sections heavy clay and sandy loam. The only portions better suited to forestry than agriculture are the comparatively small rocky and hilly areas.

The effect of the clearance of the country has not been so noticeable as in most other localities. The small streams dry up earlier in the summer, but this is attributed partly to the drainage system by which a large volume of surface swamp water is drained away rapidly in the spring. Where the land has been well drained it is capable of retaining a larger quantity of moisture than formerly in the summer season, which perhaps to some extent prevents the drouths resulting from over clearance being so severely felt as would otherwise be the case.

The protection of forests and windbreaks has been found favorable to fall wheat and clover. These crops naturally suffer less from the frost here than in most other localities on account of the character of the soil and the conformation of the land. It is the low clay lands, which if unprotected by trees, are principally subject to this danger.

Plantations of trees covering many acres are rare, but many windbreaks have been planted on a small scale. Most farmers and owners of cultivated land have planted trees to some extent as a protection to the buildings, gardens and orchards. Trees have also been set out along the highways for shelter and ornament. The effect has been greatly to improve the appearance of the country and considerably to increase the financial value of the homesteads thus improved.

A great variety of trees have been tried, both native and foreign. All kinds that are hardy enough to stand the winter do well if sufficient care is exercised in the planting. The most popular varieties are maple, ash, elm, pine, cedar, Norway spruce and Scotch and Austrian pine, all of which flourish successfully. A few walnut trees have been planted, but too recently to warrant any conclusions as to the success of the experiment.

Muskoka.

Probably about three-fourths of the district of Muskoka is still uncleared land though lumbering operations have been carried on extensively throughout this area. The country is decidedly hilly and broken, and there are many rocky ridges and swamps, rendering a great proportion of it altogether unfit for farming and adapted for permanent timber reserves. Nearly all the pine of a marketable character has been cut, and the hemlock is rapidly being removed. The predominant varieties of timber which remain are ash, oak, basswood, maple, birch, cedar, tamarack, spruce and balsam. The timber has been cut indiscriminately; many rocky tracts, which are utterly useless for any other purpose than timber growing, have been completely stripped, or after being partially cleared, devastated by fire.

The effect of the cutting down of the woods upon the water supply has not been so marked as in the more settled parts of the country, but is nevertheless very apparent. Wells and creeks dry up much sooner in the season than formerly, and snow does not fall with the same regularity as it once did.

Little or no fall wheat is grown in this district, the climate not being favourable to it. Clover has been found to flourish better when sheltered by the woods than when exposed to the winter winds.

No plantations or wind-breaks as far as known have been planted, owing to the comparatively recent settlement of the country. Some trees have been set out for ornament and shade; these are principally balsams, which thrive well.

The great danger to the remaining forest is from bush fires, which are caused by the carelessness of lumbermen, campers-out, settlers and others, and greatly promoted by the vast quantities of tree-tops and refuse left lying in the woods after lumbering operations. Of late large quantities of hemlock have been cut for the sake of the bark alone, the timber being left to rot on the ground. There is great need of stricter regulations to check this waste and prevent the danger attending it. Settlers ought to be prevented from entering upon and clearing land which is unfit for cultivation and ought to be left in timber.

Norfolk.

About twenty per cent. of this county is timbered, the kinds which predominate being elm, black and white ash, chestnut, maple, birch, and second growth pine. The surface as a general rule is undulating, but portions along the lake shore are hilly. The soil is generally good and well suited for tillage, but some parts are more adapted for tree-planting. As a result of the extensive clearing of the country many streams now dry up completely during midsummer. Most of the larger streams upon which grist mills are situated become so low as seriously to interfere with milling operations. An increase in floods has also been observed owing to the rapid flowing off of the water from the melting snow in spring time. The climate has undergone a decided change for the worse—the rainfall in the summer has been lessened and severe drouths frequently prevail.

Forest and wind-breaks have been found highly advantageous to the fall wheat and clover crops. Deprived of this shelter the snow is frequently drifted off, leaving the ground exposed, in which case the plants are liable to be winter-killed.

No plantations on a large scale have been made. The farmers generally have put in trees for ornament and shade along the roadside, using principally hard and soft maple. Such wind-breaks as have been planted are for the most part around the farm buildings and orchards, spruce, cedar and willow being the kinds generally selected. The result has been highly encouraging. Several orchards protected by a wind-break of spruce or cedar yielded heavy crops of fruit last fall, where other orchards, unprotected, were almost an entire failure under precisely similar conditions as to soil, culture, etc. Evergreens such as the Norway spruce, cedar, or some of the pine species have been found to afford better protection than the deciduous trees.

The principle obstacle in the way of forest preservation and re-planting is the short-sightness of the farmers as a class, who cannot be convinced that it is in their interest to maintain a proper proportion of wooded land. In many cases their farms have been entirely stripped of trees, and it has become necessary for them to purchase wood-lots of from ten to twenty-five acres to supply themselves with fuel, often at a distance of five or ten miles from the farm. Even under these circumstances many of them cannot be convinced that re-planting is necessary, because they do not see any profit in it for the near future. The opportunities offered by the Ontario Tree Planting Act have not in any instance been taken advantage of. The suggestion was made that this Act should be amended by adding evergreens to the list, as being more valuable for wind-breaks than the varieties specified in the Act; also that the New York Stock Law which prohibits the running at large of cattle, should be adopted in this province as a protection to trees planted on the highways.

NORTHUMBERLAND.

Like most frontier counties Northumberland has been almost denuded of its timber. The proportion of wooded land remaining is only about five per cent. of the whole. The remaining forests are principally hard wood with some cedar and a small quantity of pine. The soil is variable, its principal constituents being clay, clay-loam and sandy-loam. There is but little stony or hilly land, the surface being generally rolling and well suited for agriculture. The steep hills and ravines and the land which is too rocky for the plow could be planted with trees to good advantage.

The destruction of the forests has had the effect of lessening very considerably the volume of the rivers and streams. Many watercourses are now dry for nearly half the year, and there has been a great increase of spring floods. Drouths have not been so prevalent here as in some other parts of the country.

Fall wheat has become a very uncertain crop, and owing to repeated failures has been much less cultivated of late. The clover crop, though hardier, has also suffered from exposure caused by the absence of forest protection. It is often winter-killed and suffers from spring and summer drouths.

There has been little done in tree-planting, excepting in the immediate neighbourhood of buildings and gardens. Where this has been done the effect has been to greatly improve the appearance and increase the value of the farm. The evil of cattle running at large and pasturing in the wood-lots is prevalent, and much injury is done to young trees in this way.

ONTARIO.

Ontario was pretty thoroughly examined by means of drives through the country, in which Mr. Farewell, the energetic County-Crown Attorney of the district, gave valuable assistance. Much useful information was also gained from J. D. Howden, Esq., of Whitby, who had occasion lately to examine all the lands, wooded and otherwise, of the county of Ontario. Generally speaking, there appears to be scarcely five per cent. of wooded land left in the county, and not much of this appears to be good beech and maple. The hickory tree, that is the bitter nut, is yet found here, but no one I met knew of the existence of any sweet ones. The walnut did formerly grow in these woods, but only a few specimens were now observed, and these are planted in the open, and therefore run to branches more than to clear timber. Many valuable pine trees formerly grew here, but now there appears to be very few left. In the northern part of the county the swamps occur more frequently than in the south, and occupy sometimes from one-third to one-fourth of the land. These swamp lands are wooded with cedar, balsam and tamarack, comparatively of no merchantable value at the present time.

It was noticed that east of Oshawa, where rivers formerly existed, which gave power to a score of manufacturing industries, and where water ten feet deep allowed the construction of many vessels, there exist now but paltry streams, sometimes but a couple of feet deep, sometimes but six inches in depth.

Where farmers possessed shelter, they invariably gave their crop of fall wheat the benefit.

OXFORD.

The county of Oxford contains about five hundred thousand acres of land, of which about one hundred thousand are nominally in forest. Not more than two-thirds of this will be beech and maple, the rest being composed of various woods such as oak, ash (both black and white), with some of the nut trees, such as hickory, chestnut and walnut. There was formerly much valuable pine here, but most of this is long cleared.

The surface is generally level, and much of it very rich land. There are many rows of trees planted, both evergreen and deciduous. For instance, some fine specimens of both are to be found on the old Vansittart estate. No plantations set in close order for timber purposes were observed. The town of Woodstock possesses many rows of beautiful shade trees, principally maples. They need, however, as is indeed usual, far more careful trimming and thinning than they receive.

At a meeting of a committee of the County Council, where the subject was discussed, opinions were expressed by leading men that lines of evergreens would be the most valuable for sheltering purposes, as giving protection in winter when most needed. Moreover, some gentlemen considered that in that part of the country they were more easily handled, and succeeded even better than the maples. Besides, it was noticed that they could be planted at a time of year when the farmer has more leisure than in spring and fall, when other work presses on his attention. The opinion was general that a proper proportion of forest should by all means be preserved in the country.

Parry Sound.

The land in this district is much broken. There are many low hills and hollows and much rock. The soil varies from heavy clay to light sand, and in some places all varieties are found within the limits of a single farm. Owing to these natural characteristics there are considerable areas which are not adapted for agriculture, and which, if they are to be utilised so as to realise a continuous profit, must be kept in forest or restored to their natural wooded condition. The rocky flats and hills, many of which have been cleared or burned over, are absolutely valueless for any other purpose than tree-growing.

The proportion of land now in timber, properly speaking, not counting the scrubby second-growth that is coming up over the land devastated by forest fires, is about sixty per cent. of the whole. The chief varieties of timber extant are maple, beech, hemlock, cedar, tamarack, spruce, red oak, pine and birch. It is noted that as a consequence of the destruction of timber, small creeks dry up earlier in the season than formerly. The Georgian Bay has sunk some four feet within the last eight years, which some are disposed to attribute to the disappearance of timber about the head waters of the streams which debouch into it.

The destruction of the forest and its attendant evils are due fully as much to forest fires as to clearing or lumbering operations. It is suggested that in order to preserve the forest in those parts where the nature of the soil renders farming unprofitable, all lots having over thirty per cent. of rock should be withdrawn from sale and retained as permanent forest land, and that in sale of any timber on these lots it should be stipulated that all tree-tops be removed and burned so as to prevent the danger of bush-fires.

Perth.

This is a thickly-settled county, nearly all of the land being available for agricultural purposes, and consequently the wooded area has been rapidly diminished, until at present the area in timber is only some 15 to 20 per cent. of the whole. The surface is pretty well divided between level and rolling land, the townships of Ellice, Logan, South Easthope and Elma being for the most part level. In North Easthope, Wallace, Blanshard and Mornington the land is principally undulating. Portions of Hibbert township are hilly, and the other townships of Downie and Fullarton partly level and partly rolling country. It is doubtful whether any portions of this country could be regarded as better adapted for tree-planting on a large scale than for agriculture, considered from the standpoint of individual profit. The principal kinds of timber remaining in the uncleared portions of the county are beech, maple, black ash and elm. Basswood, pine, hemlock, cedar and birch are found in smaller proportions, and the necessities of the farmers for firewood and fencing cause steady inroads upon the woods which yet remain. The effect of settlement upon the streams has been marked, the volume of water being greatly lessened, excepting during the spring freshets and after heavy rainfall. Some are disposed to attribute this to drainage operations, which may perhaps be a contributing cause, though there is no doubt that the principal factor in this change is the destruction of so large a proportion of the timber about the streams. The farmers as a rule appear slow to realise the need of forest preservation or replanting as a means of averting the evil of alternate floods and drouths and providing for the needs of the near future.

PETERBOROUGH.

The land of this county is principally rolling, and in some places hilly, and the soil clay or clay loam, and excellent for cultivation. The proportion of uncleared land is small—probably not more than five per cent. in those sections of the county comprising the more desirable farming land, but somewhat larger where the soil is not so fertile. The native forest trees which still remain are chiefly beech, maple, elm, ash, balsam, spruce and hemlock.

Not much attention has been so far given to the preservation of the remaining tracts of forest or to replanting What has been done is mainly in the way of planting trees for ornament and shade about the buildings, or bordering on the roads. The kind of trees most in favor are the maple, spruce and elm. The more intelligent class of farmers are beginning to take an interest in the subject, and tree-planting is much more common than a few years ago. The opinion was expressed that further encouragement in the form of premiums or exemptions from taxation upon plantations or land permanently kept in timber would considerably stimulate tree-planting, as it is difficult to induce farmers to lay out money and labor without some prospect of a more immediate return than that promised by forestry, considered from a purely business standpoint.

The general opinion is that fall wheat and clover are benefited in no small degree by the protection afforded by woods, which act as a shield against the wind.

The destruction of the forests has been followed, as in other places, by the drying up of many small streams and springs in the hot weather, and the volume of water in the rivers has been considerably lowered. No floods of any consequence have occurred, but the farmers have suffered much from protracted drouths.

There are many thousands of acres of waste land in the northern portion of this county, which were formerly partially covered with timber. This has been cut, and the county swept with bush fires, which in many places have left only the bare rock. A second growth of poplar, birch and other woods is springing up. These waste lands, which are entirely unfit for agricultural uses, ought to be kept permanently in timber.

PRESCOTT.

About one-third of the County of Prescott, at a rough estimate, is still timbered land. There is a good deal of maple standing, the sugar bush having in most cases been preserved. The other leading varieties of timber which remain are elm, beech, birch, basswood, ash, cedar, hemlock, spruce, tamarack and balsam. The pine that still exists is principally second growth, and there is little that is marketable. The land is pretty equally divided between level and rolling ground, and there is none of a very hilly or broken character. Some portions are better suited for tree-planting than for agriculture.

A lessening in volume of the streams has been noticed as taking place simultaneously with the clearing of the country, but this has been intensified by the drainage system, which runs off the surface water early in the spring.

Fall wheat does not grow successfully in this county. The clover crop is found to thrive better under protection from the wind, so that the snow does not drift and leave it exposed to the action of the frost.

Very little has been done in the way of setting out plantations or wind-breaks. Where the latter have been planted evergreens have been found to answer best. The black walnut, when planted, has been found to thrive well. Mr. J. C. Marston planted about 150, which are probably the only trees of this kind in the county, and reports that they are fully as hardy as the butternut or maple. The farmers, as a class, are slow to realise the need of forest preservation, and the wood-lots are usually neglected and exposed to the devastations of cattle.

Renfrew.

The portion of the county still in timber is probably one-third of the whole, and perhaps an equally large extent of uncleared land has been swept by fire, destroying the timber. The most plentiful kinds of trees now found are white and red pine, white spruce, maple, tamarack, birch, beech, red and white oak, ash and elm. The surface of the country is generally rolling, with level flats interspersed, and broken by the Opeongo hills. The general quality of the soil is good, but there are some stretches of light, sandy ground which could profitably be given over to tree-culture, as farming there is barely remunerative.

The flow of water in the streams at all times of the year, excepting a short period in the spring, has been very materially decreased of late years. So much is this the case that streams which were formerly regarded as permanent sources of water power are now valueless for that purpose.

The shelter afforded by forests and windbreaks has been observed to be favorable for all kinds of crops. Not many windbreaks have been planted, but the beneficial effects of those which are in existence have been very apparent. A considerable variety of trees have been tried for this purpose, including spruce, balsam, poplar, pine, maple, birch and willow. Experience has shown that pines flourish best when raised from the seed and set out, if transplanted close together, so that they protect each other.

Among the suggestions received from those familiar with local conditions and needs in this county as to the best means of preserving and restoring the woodland, were the following: That societies for the purpose should be formed, similar in plan and working to agricultural associations, and premiums offered for the largest and best plots and belts of young trees at different stages on patented lands. That the Government should prevent the cutting on Crown Lands of timber of a smaller size than twelve inches in diameter at the butt end. When all timber over that size has been cut the Government agents should be required to see that no more cutting is done, and the fire guardians instructed to take every means for the prevention of fires. Before lots in new townships are thrown open for settlement they should be examined to ascertain whether they are fit for cultivation or not. If found unsuitable for farming, they should be withdrawn from settlement and allowed to remain in timber. Every encouragement should be given for the removal of the dead timber, which from its liability to take fire easily, is always a source of danger to the growing timber.

Simcoe.

The land of this county is in the main level, with some undulating ground and a smaller proportion which is too hilly for successful cultivation It is mostly choice agricultural soil, the only portion which would be better adapted for tree planting as a directly profitable investment being the hilly and rocky areas and swamp lands. The process of clearing has been carried on recklessly and indiscriminately, many parts which owing to their unsuitableness for farming should have been left in timber having beer wholly or partially denuded. The proportion of timbered land remaining is estimated at from eight to ten per cent., and the process of destruction is still going forward. Beech maple, hemlock, ash and tamarack are the chief kinds of timber yet extant.

The volume of water in the streams has much decreased since the land was cleared and some of the small creeks have altogether dried up. Floods are frequent in the springtime and severe drouths often cause considerable loss and inconvenience to the farmers in summer.

Little, if anything, has been done in the planting of windbreaks, though the usefulness of a belt of trees as a protection to crops from the wind, especially in winter is generally admitted.

Victoria.

In the southern portion of this county the land has been much more thoroughly cleared than in the northern section, being much better soil. In the Townships of Mariposa, Ops, Emily, Eldon, Fenelon and Verulam there is not more than ten per cent. of forest land, while in the remainder of the county to the north the proportion of uncleared land is estimated at about sixty per cent.. though considerable areas of this have been overrun by brush fires. The principal kinds of timber remaining in the southern part are cedar, tamarack and spruce in the swamps, and some hardwood which is rapidly diminishing. The pine is nearly all gone. The leading varieties in the northern sections are maple, hemlock and cedar.

The land in the front townships is generally level or with a slight southern incline. The northern portion is more rolling with hills and ravines in places. Some portions would be better suited for tree-planting than anything else, especially the ravines and hillsides and localities which are too rocky or stoney for profitable cultivation, of which there are not a few.

Floods have undoubtedly been more frequent since the country has been so largely cleared. The effects of continued dry weather are more severely felt than formerly, owing to the greater evaporation from the soil when exposed to the heat of the sun and to the influence of drying winds.

Forty or fifty years ago the area of cleared land was so small in proportion that all crops were practically surrounded by woods. The snow then covered the ground evenly and generally remained until after the middle of April or until all danger from spring frost was passed. Latterly, owing to the uncertainty of the crop when deprived of this protection, there has been but little fall wheat sown. Belts of trees along the roadsides, line fences or in other appropriate situations are much needed as a protection to the fields. In some places wind-breaks have been planted, but as yet the trees are small and it is too early to speak as to actual results. Maples have been found to flourish well, and evergreens also, if planted at the right time.

The farmers are as a rule indisposed to undertake the trouble and expense of preserving woodlands or replanting unless assured of some pecuniary benefit in the near future. The exemption of forest lands and plantations from taxation to the extent of 25 acres on each 100 acres would, it is thought, be a considerable incentive in this direction.

Waterloo.

The timbered area of the County of Waterloo is estimated at not over 15 per cent of its whole extent. The land is principally rolling with a few hills, and nearly all well suited for tillage, being principally loam with some smaller areas of sand. The woods which are left are mainly beech, maple, black ash and cedar, with some elm. They are rapidly diminishing to supply the demand for fuel and timber for manufacturing purposes. The usual results have followed the indiscriminate clearings that have been made, viz., floods in the springtime and after heavy rainfalls, and the drying up of the creeks during the heat af the summer. The absence of forest trees has also left the crops more exposed to the effects of drouth.

By plantations or windbreaks so far little has been done to counteract the effects of over-clearance. A few windbreaks have been made, and the farmers who have adopted this means of protecting their crops from the sweep of the winter winds are exceedingly well satisfied with the result. It is probable that as the value of this improvement becomes better understood many others will follow their example. The trees used for this purpose have been principally hard and soft maples.

Testimony is practically unanimous as to the advantage afforded to the fall wheat and clover crops by the protection of trees, especially if the latter are situated on the west and north sides of the field. A farmer speaking from experience is of opinion that

the planting of black walnut trees would be a paying investment. He has at present such a plantation twenty-eight years old. The exemption of bush lands and plantations from taxation are recommended as measures which would induce the farmers to take an interest in restoring the due proportion of forest.

Welland.

At an outside estimate fifteen per cent. of the area of Welland is yet wooded. The principal species of trees now growing within its limits are beech, maple, ash, elm, oak, including pine oak and chestnut oak, and chestnut. Nearly all the land is available for agriculture. It is as a rule level, but there is an area of rolling sandy land in Pelham township, and large marshy tracts in Wainfleet and Humberstone, partly drained. This section is not valuable for farming purposes, and might be more profitably planted with cedar or soft woods.

Owing to the conformation of the country it is not liable to floods, but an increase of severe and protracted drouths has been noticed since the removal of the timber. Wind-breaks and forests have been found advantageous as a protection to crops. Northerly winds are not so injurious here as in other parts, and protection is principally needed against winds from the south-west. In the vicinity of Niagara Falls single rows of Norway spruce have been largely planted, and have proved effective as wind-breaks. In many places maples have been set out along the roads. Norway spruce, European larch, arbor vitæ and Scotch pine are considered the best kinds for wind-breaks.

Wood lots from which the cattle are excluded maintain their growth of trees unless too freely culled. On the steep hills and other places where the soil is not favorable for tillage, chestnut plantations would be a profitable investment, the nuts and timber being both marketable. When the trees are cut the stumps usually send up shoots which, when they attain sufficient thickness, can be cut for posts. As there is likely to be a considerable demand for posts, such plantations would be a profitable source of revenue. The rapidly growing kinds of cherries could also be used as wind-breaks.

Wellington.

Only a very small proportion of the land of Wellington is still timbered. Some farms are entirely stripped of wood, and fuel has to be procured from a distance. What remains of the original forest is gradually diminishing, except in the swampy portions, where there is a steady growth of underbush. Nearly all the commoner varieties of timber are represented, but the proportion of soft wood is relatively on the increase. The country is generally rolling, and the soil varies from clay to sand, being generally good agricultural land, but there are a number of small tracts of little value to the farmer, which might be advantageously utilised for timber growing.

As regards the effect of the destruction of the woods on the water supply, the seasons have been so variable of late, that it is difficult to draw any definite conclusions. The water undoubtedly runs away faster in the spring than formerly, but owing to the removal of obstructions in the streams, does not necessarily rise higher. The volume of the current in rivers and streams, through the summer, is much smaller and of less value for manufacturing purposes.

Fall wheat has latterly become a very uncertain crop, especially when sown late. There is no noticeable difference in the clover crop which does well on suitable soils.

No plantations worth mentioning have been made, but on quite a number of farms rows of trees have been set out on the roadside. These are generally maples. The hard maple does well where the soil is sufficiently dry, but is of slow growth, and the effect on crops is not discernible as yet. Soft maple, ash, and the softer woods, do better on a low, moist soil. There is urgent need for the preservation of what timber exists, by careful fencing, so as to permit the growth of young trees, and planting where it is necessary to replace the timber removed. Municipal encouragement to plant on roadsides and on waste lands is needed, to induce the farmers to actively interest themselves in the matter.

Wentworth.

In this county the proportion of timbered land to the total area is about one-fifth. This is owing to the existence of a large swamp in the township of Beverly. In most of the other townships the proportion of wood to cleared land is much smaller than the general average. In the swamp lands, tamarack, spruce, balsam, cedar, birch and elm prevail. Elsewhere oak, elm, pine, maple, beech and chestnut are found. The surface and composition of the soil varies considerably in different localities. The conformation of the land is generally rolling. Portions of Beverly, West Flamboro' and Ancaster townships, are hilly and stony, so that cultivation is difficult, and would be more profitably devoted to forestry than to farming.

As a consequence of extensive and indiscriminate clearing, the streams have decreased materially in volume, and some have entirely dried up. The effect has been intensified by drainage operations, which draw the surface water off rapidly in the spring.

Numerous windbreaks have been planted, and the expectations formed of their utility as a protection to the fields have been fully justified by the results. Of the trees generally used, the balsam has been found to answer best. The pine is regarded as even superior as a protection, but is difficult to grow unless planted from seed. It is found that grain grown under the shelter of timber flourishes better and yields more largely than where this is lacking and the crop is more exposed to the wind.

The equal taxation of timbered land and that in immediate profitable use for farming, is regarded as one great cause of indiscriminate clearing. The farmer or land-owner holding a wooded lot and paying annual taxes on it, is often practically forced to cut and sell the timber in order to prevent its being too heavy a burden to carry. It is suggested that if a discrimination were made, and the taxes considerably lowered on timbered land, or even abolished altogether for a limited area, there would be a much greater disposition to retain land in timber than at present exists.

REFORESTATION IN FRANCE.

There is probably no country where the destruction of the woods has been attended with more serious and obviously direct consequences than France, or where the action taken to remedy the evil has been more strikingly successful. This is owing to the conformation of the land in the region of the high Alps and other mountainous parts, where, of course, the elevation of the ground renders the danger of floods much greater than in a comparatively level country. In a land destitute of high hills, and where the soil is sufficiently porous to absorb and retain much of the rainfall, the results of deforestation, though in the end disastrous, are gradual. In mountainous regions they are catastrophic, and cause and effect are more directly apparent than in the slower climatic changes wrought in a level country.

Hence reforestation has for many years been an urgent and practical question in France as a means of arresting the devastation wrought by mountain torrents, and much attention has been devoted to the subject by scientists. Those conclusions, based upon lengthened observation and experience, are of great value in dealing with similar conditions elsewhere. A prominent feature of extensive regions in the high Alps is the indentation of the mountain slopes by ravines, of greater or less depth, created by the action of floods. These are known as torrents, in the formation of which a great deal of valuable land has been undermined and swept away, while the once-fertile plains beneath have been covered with the detritus The only efficacious means of dealing with this destructive process has been found to be the replanting with timber the denuded lands, seconded in some cases by the formation of a heavy turf upon the ground adjacent to the water-courses.

Surell, one of the ablest French authorities on the subject, gives a graphic picture of the consequences of deforestation in the valley of the Dévolery, which affords an idea of the extent of the evil with which the government undertook to grapple :

"The Dévolery forms to the west of the Department of the High Alps an elongated valley, divided into two parts by a little *col*, and circumscribed by elevated mountain chains. It is entered by five passages, which are gorges or *cols*, which the horrors of the locality make impracticable for passage during a part of the winter. The mountains are bare—eaten up by the flocks and by the sun—they are without shade and without verdure. The bases of the mountains are almost deserts, having been ruined by the deposit of material dejected from ravines. The aspect of this miserable country is oppressive to the soul. One would say of it, "It is smitten with death." The pale and uniform color of the soil, the silence which weighs on the fields, the hideous spectacle of these mountains flayed by the waters and falling into disintegration, and everything about them announces a miserably ruined decrepitated land, which does not appear even to struggle against or resist, or resent its destruction. The unchanging serenity of the sky, which anywhere else would be a trait of beauty, adds here to the melancholy sadness of the country."

The writer goes on to show that every indication points to the country having been formerly wooded. Buried trunks of trees are exhumed from the peat. Pieces of enormous timber such as are not now to be found growing anywhere in the district, are seen in the framework of the older houses, and many localities utterly destitute of trees, bear the name of wood. The destruction of the forests began on the flanks of the mountains, and by degrees descended to the depths of the valleys and ascended upwards to the summits. Then came the Revolution which swept away completely what remained of the woods. The pasturing of flocks rendered the soil, once held firmly together by the interlacing roots of trees, more susceptible to the ravages of water.

It is not surprising that, owing to straits to which the people have been driven for lack of fuel, and the devastation caused by the torrents, large districts once fertile have been depopulated. Here and there on the brows of many hills are traces of old fields and estates, the stone boundary walls of which yet remain now desolate and unoccupied. As regards the effect of excluding flocks and allowing Nature to re-assert herself in providing the mountain slopes with their natural covering, Surell says :

"Some communes, dreading the future, have enclosed some quarters, as the mountain of Chaumette, quartier de Manibonx, quartier de Lierravesse, quartier de Auroux near Saint Etienne. Immediately vegetation has again gained possession of the soil, the herbage, bushes and shrubs have spread with wonderful rapidity and formed what are called *blanches* in the country. Whole forests have sprung up on the soil of the forests which were destroyed at the Revolution, but which the inhabitants, now inspired by a better feeling, have subjected to a regular course of forest management. Finally, on the same mountain brows, enclosed portions assume by the end of two years, appearances different from that of those given up to the sheep. The latter are bare and cut into ravines ; the former are covered with vegetation, the soil is consolidated, and the ravines carpeted with tufted plants look like cicatrices occasioned by wounds which are under the benignant influence of a topical application. In the two quarters the exposure, the slopes, the soil are the same ; the mere fact of putting them *en reserve* has determined the difference."

M. Surell goes on to say that in every instance the lands which are devastated by torrents of recent origin are found to be stripped of their trees and of all kinds of arborescent vegetation. On the other hand, mountain slopes which have been recently denuded of their timber are invariably found to be indented by torrents of the smaller order, evidently only of late formation. Everywhere where there are recent torrents there are no more forests, and wherever the soil has been stripped of wood, torrents have lately been formed. The names of numerous mountains and torrents, an examination of which has led to these conclusions, are given. There was not at the time he wrote a commune where the older residents could not testify that on such a hillside, then stripped and devoured by the waters, they had formerly seen fine forests standing without a single torrent. Especially after the excessive destruction of woods which followed the Revolution was this great change noticeable, and many great torrents date from this epoch.

The action of forests is not confined to preventing the creation of new torrents, but is a sufficiently powerful influence to extinguish torrents already formed. The injurious result of forest destruction is not only to open everywhere the soil to new torrents, but to augment the violence of those existing, and to resuscitate those which appear completely extinct. The effect of the woods in preventing torrents is thus accounted for:

"When the trees fix themselves in the soil the roots consolidate this, interlacing it with a thousand fibres, their branches protect it as would a buckler against the shock of the heavy rains; and their trunks, and at the same time the suckers, brambles and that multitude of shrubs of all kinds which grow at their base, oppose additional obstacles to the currents, which would tend to wash it away. The effects of all this vegetation is thus to cover the soil in its nature mobile, with an envelope more solid and less liable to be washed away. Besides, it divides the currents and disperses them over the whole surface of the ground, which keeps them from going off in a body in the lines of the *thalweg* and meeting there, which would be the case if they flowed freely over the smooth surface of a denuded ground. Finally it absorbs a portion of the waters, which are imbibed in the spongy *humus*, and so far it diminishes the sum of the washing away forces. It follows, then, that a forest establishing itself on a mountain actually modifies the surface of the ground, which alone is in contact with atmospheric agents, and all the conditions find themselves there modified as they would be if a primitive formation had been substituted for a formation totally different. Whence it is not more astonishing to see the same soil alternately cut up and free from torrents, according as it is despoiled or clothed with forests, than it is astonishing to see torrents cease when we come to primitive formations, or re-appear suddenly on friable limestone."

A work by Mons. L. Marschand, *Garde-General* of the French forests, published in 1872, embodies the results of observations made for seven years in the valley of Barcelonette, and also of observations made in the Austrian Alps and Switzerland. The author was led to conclude that the effects produced by trees observed by Surell and others were primarily and chiefly, if not altogether, produced by their roots by modifying the permeability of the soil and increasing its power of retaining water. This was in his opinion the case, even when the ground was rock.

After referring to the natural history of mountains and the modification of their primary conditions caused by aqueous influences, and disintegrations by frost, and pointing out how these agencies were counteracted by vegetation, and afterwards re-asserted themselves on the clearing away of forests, he says:

"There is an action but little observed, but one which goes on with very great activity, in the decomposition of rock. It is that effected by roots. In twelve days the roots of the *phaseolus multiflorus* (the scarlet kidney-bean) has produced on polished marble great markings a demi-millimetre in depth, like the traces of an engraver's tool; experiments made with other plants and on other kinds of rock gave similar results. Of these twelve days, six were taken by the root in reaching the marble and in the remaining six days these markings were made. It may be inferred that the presence of forests, which develop a great many roots deeply penetrating the ground, will have for its effect considerably to increase the riches of the soil by expediting the decomposition and disintegration of the rock. If we think of the results obtained in a few days by the experiment in question, we may form some idea of the influences of forests acting throughout hundreds of years; and we may be prepared to admit that the rocky subsoil of the forests, although protected against extreme atmospheric influences, may be disintegrated at least as rapidly as if it had been exposed to the direct influence of the atmosphere through the influence of the roots of trees. It is to this operation that we may attribute the gently rounded forms of calcareous rocks covered by the soil of forests."

Mons. Marschand cites a number of experiments showing that the absorption of water is proportioned to the degree of sub-division of the material composing the rock, and infers that the effect of the roots of trees in gradually pulverising or disintegrating the rock must be to largely increase its power of retaining water. On a permeable soil or subsoil trees create and maintain on the surface a layer of *humus* which serves to retain the moisture. While on rock the roots break up the surface by degrees and increase its permeability. Rain falling on a denuded brow of a hill composed of argilla-

ceous earth moistens the surface which absorbs a great quantity of water, but when once the surface is saturated the transmission of water goes on very slowly from particle to particle in consequence of the minute subdivision of the molecules. The water absorbed remains on the surface and dilutes the superficial layer, which is soon transformed into a thin clay. A layer of greater or less depth will then detach itself from the surface of the mass and flow off in thin mud according as the rain may have been more or less violent. By a gentle rain a superficial layer is moistened, but the water falling slowly may be able to penetrate the soil more thoroughly and the flow will be slighter. If the ground were wooded the foliage would intercept and moderate the rainfall, in addition to augmenting the absorbent power and increasing the permeability of the soil. The mobility of the surface would be increased, but the network of roots would retain the ground so that no amount of direct rainfall could cause it to slip away. The first effect of a forest is to cover the soil with a thick layer of *humus* and of moss, which possess in a high degree the power of retaining moisture. As the greatest storms of rain never do completely saturate the *humus* on wooded soils, it is impossible to form torrents on these.

After extensive surveys from 1884 to 1886, covering 8,645,000 acres, with a view to undertaking the work of reforestation on a systematic and comprehensive scale, the total area to be placed under forest management by the state was fixed at about 790,400 or a fourth of the whole area to be reforested. The operations carried on directly by the government upon the lands most needing them, will cost more than the reforestation of the other three-fourths which are to remain in private hands and to be made valuable by means of state bounties.

The method of treatment is based upon the scheme of ultimately reforesting all the tributaries of each basin susceptible of being washed away. The forest when re-established in its place on the upper basins is of itself capable of insuring the ultimate extinction of the torrent.

Supplementary to the work of reforesting the sides of hills or mountains as a means of preventing torrents, the system of corrective works as a means of mitigating their ravages, in the meantime has been adopted in France with marked success. These works are sometimes in the form of ramified superficial drains, by which the water from melting snow or heavy rains is dispersed in various directions, and prevented from accumulating in a large volume; but more generally barriers or rectifications of the bed of the water course. The object of these is to establish a fixed and definite bed, and prevent erosion and the washing away of the banks by the sudden rush of water. Rough barriers are built up, forming a series of stairs across the channel. In some cases the bed is covered with branches or whole trees thickly piled with their tops up stream where the slope is steep. In addition to these impediments to the too-rapid flow of water, first-class dams of solid masonry are constructed at short intervals across the channel. The effect of these barriers has been to preserve the banks and prevent the torrent devastating the adjoining lands; and also to break the force and rapidity of the rush of the water, and retain the soil and *debris* which the swollen current formerly carried down with it. Retaining walls, or in some cases, large rocks ranged along the banks, have been found a good defence for the shore against erosion. In treating of this subject, Mons. P. Demontzey, Forest Administrator of France, whose assiduous labors during the last quarter of a century have resulted in the redemption of the devastated mountain districts in the south of France, in a paper read before the French Association for the Advancement of Science, gives several instances in which corrective works have been successfully applied to torrents simultaneously with the process of reforesting. The torrent of Bourget empties into the Ubaye just above Barcelonette. The first operations began in 1870, with the re-forestation of all the stable lands of the basin. Woody vegetation has now taken possession of all the basins formerly denuded, and the young forest thus created is increasing from year to year. The unstable lands have been fixed by a series of corrective works begun in 1872. The principal of these have been confined to the middle section of the torrent, and required the construction of twenty dams of masonry, varying from three to eight meters high. The subjection of the Bourget has been assured for nine years by a young forest of 988 acres which occupies the upper basin.

A more arduous task was the subduing of the torrent of Riou-Bourdoux, famous for its devastations, which was classed as incurable, and was in full activity fifteen years ago, cutting under the foot of its banks and starting land slides over enormous areas. In 1875, the work of restoration was undertaken. The bed of the torrent was rectified in the channel of erosion, and the upper basin reclaimed by the planting of 3,000 acres now restored to forest. The torrent has been completely subdued, and an area of 593 acres restored to agricultural use.

The Comte of Péguère, flowing with a steep descent through granitic rocks broken in all directions, which being surrounded with loose, sandy earth, were in a state of great instability, offered great obstacles to the work of subjection. Great avalanches of rock falling down the precipitous slope as the result of a sudden melting of snow or heavy rainfall, were a constant danger to the neighborhood. The construction of a system of walls on such a steep declivity was considered impracticable. The solution was found in removing all loose blocks, the fall of which seemed imminent, re-clothing the shifting and loose sands with grass, and constructing retaining walls of dry rock wherever the accumulation of rocks left no room for vegetation to find a foothold. The execution of the work was exceptionally dangerous and difficult; but it was accomplished in a manner to satisfy the most sanguine expectations, and this dangerous torrent has been repressed.

M. Demontzey, speaking of the success of the French system of reforestation as a means of preventing torrents, says: "The problem offered by the laws of 1860 and 1882 is now solved. Facts have abundantly proved that the solution is neither long nor costly, and that it is only necessary to aid nature by a series of small measures, judiciously conceived and carried on with system and persistence. The 579 square miles of forests recently created in the three regions, whether by the State or by communities and individuals, insure quiet for the future, and demonstrate by their vigorous growth, how empty were the allegations of the politicians, who in 1860 ridiculed the possibility of reforestation. The task, indeed, is hard and thankless. It is on the most desolate mountain heights, or in the depths of gorges, which they alone penetrate, that the foresters do their work quietly, often in the face of public indifference, or even the hostility of selfish interest.

NEW VARIETIES OF TREES.

The address of President, George L. Goodale, of the American Association for the Advancement of Science, delivered at the annual convention of that body in Washington, in August of last year, contains many interesting and valuable suggestions on the subject of forestry. Though something has been done of late years in the introduction of new varieties of trees, adapted to our conditions of soil and climate, as Mr. Goodale shows the possibilities of enterprise of this sort are very far from being exhausted. With the rapidly growing demand for timber of all merchantable kinds, and the corresponding diminution of the supply, the question of how best to utilise our waste lands adapted only for tree-culture, by securing the most profitable varieties as regards rapidity and certainty of growth and marketable value, will soon be a very practical one. The concluding portion of the extract from Mr. Goodale's address which follows, contains a useful suggestion to the owners of large tracts of cleared, or partially cleared land in our back townships, which are being covered with a second growth of poplar and other woods at present regarded as of little value. As the address shows, the growth of the wood-pulp manufacture is creating a demand for this kind of timber which is certain to increase, so that before long, the despised second growth, if preserved, may prove a considerable source of revenue. In addition to the poplar, many of the cleared pine lands are producing young pine trees. If a little labor and care were bestowed on regulating their growth, filling up vacant spaces by transplantation, so as to secure something like regularity of distance, and utilise the land to its full capacity, it would prove an excellent investment.

Can we look for new timbers and cabinet woods? Comparatively few of those in common use are of recent introduction. Attempts have been made to bring into great prominence some of the excellent trees of India and Australia which furnish wood of much beauty and timber of the best quality. A large proportion of all the timbers of the South Seas are characterised by remarkable firmness of texture and high specific gravity. The same is noticed in many of the woods of the Indies. A few of the heavier and denser sorts, like jarrah, of West Australia, and Sabicu, of the Carribean Islands, have met with deserved favor in England, but the cost of transportation militates against them. It is a fair question whether in certain parts of our country these trees and others which can be utilised for veneers may not be cultivated to advantage. Attention should be again called to the fact that many plants succeed far better in localities which are remote from their origin, but where they find conditions substantially like those which they have left. This fact, to which we must again refer in detail with regard to certain other classes of plants, may have some bearing upon the introduction of new timber trees. Certain drawbacks exist with regard to the timber of some of the more rapidly growing hard wood trees, which have prevented their taking a high place in the scale of values in mechanical engineering.

One of the most useful soft-wooded trees in the world is the kawri. It is restricted in its range to a comparatively small area in the North Island of New Zealand. It is now being cut down with a recklessness which is as prodigal and shameful as that which has marked our own treatment of forests here. It should be said, however, that this destruction is under protest: in spite of which it would seem to be only a question of a few years when the great kawri groves of New Zealand will be a thing of the past. Our energetic Forest Department has on its hands problems just like this which perplexes one of the new lands of the South. The task in both cases is double: to preserve the old treasures and to bring in new.

The energy shown by Baron von Mueller, the renowned Government Botanist of Victoria, and by various forest departments in encouraging the cultivation of timber trees, will assuredly meet with success. One can hardly hope that this success will appear fully demonstrated in the lifetime of those now living, but I cannot think that many years will pass before the promoters of such enterprises may take fresh courage.

In a modest structure in the city of Sydney, New South Wales, Mr. Maiden has brought together, under great difficulties, a large collection of the useful products of the vegetable kingdom as represented in Australia. It is impossible to look at the collection of woods in that museum, or at the similar and more showy one in Kew, without believing that the field of forest culture must receive rich material from the Southern hemisphere.

Before leaving this part of our subject it may be well to take some illustrations in passing, to show how important is the influence exerted upon the utilization of vegetable products by causes which may at first strike one as being rather remote.

1. Photography makes use of the effect of light on chromatized gelatine to produce under a negative the basis of relief plates for engraving. The degree of excellence reached in modifications of this simple device has distinctly threatened the very existence of wood engraving, and hence follows a diminished degree of interest in boxwood and its substitutes.

2. Iron, and in its turn steel, is used in ship-building, and this renders of greatly diminished interest all questions which concern the choice of the different oaks and similar woods.

3. But on the other hand, there is increased activity in certain directions, best illustrated by the extraordinary development of the chemical methods for manufacturing wood pulp. By the improved processes, strong fibres suitable for fine felting on the screen, and fit for the best grades of certain lines of paper, are given to us from rather inferior sorts of wood. He would be a rash prophet who should venture to predict what will be the future of this wonderful industry, but it is plain that the time is not far distant when acres now worthless may be covered by trees under cultivation growing for the pulp-maker.

There is no department of economic botany more promising in immediate results than that of arboriculture.

THE INCREASED DEMAND FOR WOOD.

A fact which ought not to be lost sight of by those who own wooded tracts of land or land more adapted for growing timber to advantage than for farming purposes, is that the demand for timber and wood in all its forms is continually on the increase. As the country is cleared the supply is steadily diminishing, and as population increases and the sources from which the supply is drawn become exhausted, the value of timber-yielding land must steadily increase. The men whose foresight now leads them to plant timber, or to carefully preserve the remains of forest, will in a few years be amply rewarded for their expenditure of means and labor in providing for a certain future demand. The following extract from a manual entitled "Practical Forestry," by Andrew J. Fuller, sets forth very clearly the situation in regard to the value of wood of all kinds in the near future:

"No one who is at all familiar with forests and their products needs to be reminded of the importance of having at hand an abundance of wood of various kinds, or how much it contributes to the general welfare and happiness of a nation. But there are those who have not paid much attention to the subject who claim, and no doubt honestly believe, that the great progress made of late years in the use of iron in place of wood in building houses, bridges, piers, ships and other structures, are but indications of what is to follow, and that in a few years there will be no great demand for wood in any form.

"The building of railroads, which reach almost every part of the country, has aided in the distribution of coal and made this in a great measure a more convenient and in many instances a cheaper fuel than wood, but in building these roads a vast quantity of wood has been used and of the best kinds, not only for ties, of which nearly or quite three thousand are put down per mile, but on many of the roads wood is still used for fuel. There is now nearly or quite one hundred thousand miles of railroads in the United States, and we have only to multiply this by three thousand to ascertain that 300,000,000 of ties have been used in their construction, leaving out of account the thousands of wooden bridges and other structures, in the building of which more or less wood is consumed.

The railroads may have assisted very materially in checking the consumption of wood for fuel, but they have probably more than balanced the account in the amount used in their construction. Besides, the 300,000,000 ties must be duplicated every ten years, for the average life of a railroad tie will scarcely exceed a decade, and with nearly all kinds except the best oak it is a year or two less. The demand for railroad ties is not likely to decrease but increase, although as timber becomes scarce and prices advance preserving processes will doubtless be employed to prevent decay. Stone, brick and iron will also come into more general use for building, but the increase in population will also tend to an increase in the demand for other purposes besides that of building.

"It is only a little more than a century since coke was first employed for smelting iron ores. The introduction of this fuel to take the place of charcoal, it was thought, would save the forests of the world from destruction by the charcoal burners, and while it has done much towards making it possible to produce sufficient iron to meet the great and constantly increasing demand, it has not superseded charcoal, and there is probably more charcoal used to-day than at the time when coke was first employed in a smelting furnace. Charcoal is still used in furnaces and forges and there are several establishments in this country that use annually over a million of bushels each, and a score of others that consume from twenty to twenty-five hundred thousand bushels.

"Notwithstanding the number of substitutes that are employed, the demand for and consumption of wood appears to increase, and to-day there is probably more wood used in making boxes of various kinds than there was used in the construction of buildings of all kinds in this country three-quarters of a century ago. Furthermore, no kind or quality, of timber appears to escape the insatiate demands of the artisan of the period, and he not only finds ready uses for the large and small, the hardest, toughest and most durable, but also for the soft and spongy, the latter being preferred for grinding up into wood pulp for making paper.

"Not a year passes during which scores of new devices and inventions of new articles of manufacture are not brought forward that are made in part or wholly of wood, and while singly they may not call for a great quantity, they do in the aggregate use up an enormous amount.

"The invention of a pleasing toy for children has frequently caused the demolishing of hundreds of acres of forests to supply the manufacture of wood used in its construction. It is idle to talk of our natural forests furnishing a supply of wood for the future use of our people. Even with the more careful management and economy in preventing waste, there must soon come a time of great scarcity of all kinds of wood. With an increase in population, there must necessarily follow a corresponding increased demand, because experience has shown that whenever any other material has been substituted for wood, it merely releases a certain amount, or allows it to seek other channels or markets. No matter in what direction we turn, the fact meets us that the best and most valuable forests of the United States are rapidly disappearing, and the sooner we commence as a nation to economise in the use of wood of all kinds, and preserve the forests now existing as well as commence planting new ones, the better it will be for the present as well as future generations."

FOREST MANAGEMENT IN EUROPE.

The importance attached to forestry in Europe as a means of regulating the timber supply, and preserving the climatic conditions may be understood from the very elaborate and complicated system of forest management, which obtains in most continental countries, notably France and Germany, as contrasted with the haphazard methods, and utter want of intelligent system generally prevailng on this continent. A good idea of the subject is given in a paper read some time ago by Dr. Campbell-Walker, before the Otago Institute, in Dunedin, New Zealand, on "Forestry in Germany and France," a portion of which is here reproduced. The extremely complex mechanism of the German and French system would probably be unsuited to this country, but there is surely a desirable medium to be found between the intricate red-tape regulations of the Old World, and comparative lack of system under which many regions which ought to have been kept permanently wooded, here are allowed to lie waste. There are some suggestions in regard to the plan of clearing with a view to reproduction, which may profitably be studied by land owners who wish to preserve their wood-lots in good condition.

When a forest is about to be taken in hand and worked systematically, a surveyor and valuator from the forest staff are despatched to the spot—the former working under the directions of the latter, who places himself in communication with the local forest officer (if there be one), and the local officials and inhabitants interested, and obtains from them all the information in his power. The surveyor, first surveys the whole district or tract, then the several blocks or subdivisions as pointed out by the valuator, who defines them according to the description and age of the timber then standing, the situation, nature of soil, climate, and any other conditions affecting the rate of growth and nature of the crops which it may be advisable to grow in future years. Whilst the surveyor is engaged in demarcating and surveying these blocks, the valuator is employed in making valuations of the standing crop, calculating the annual rate of growth, inquiring into and forming a register of rights and servitudes with a view to their commutation, considering the best plan of working the forest for the future, the roads which it will be necessary to construct for the transport of timber—in fact, all the conditions of the forest which will enable him to prepare a detailed plan for future management, and the subordinate plans and instructions for a term of years to be handed over to the executive officer as his "standing orders." A complete code of rules for the guidance of the valuators has been drawn up and printed, in which every possible contingency or difficulty is taken into consideration and provided for. Having completed their investigations on the spot, the valuator and surveyor return to headquarters and proceed to

prepare the working plans, maps, etc., from their notes and measurements. These are submitted to the board or committee of controlling officers, who examine the plan or scheme in all its details, and if the calculations on which it is based be found accurate, and there are no valid objections on the part of communities or individuals, pass it, on which it is made out in triplicate, one copy being sent to the executive officer for his guidance, another retained by the controlling officer of the division, and the original at the headquarters' office for reference. The executive officer has thus, in his hands full instructions for the management of his range, down to the minutest detail, a margin being, of course, allowed for his discretion, and accurate maps on a large scale showing each subdivision of the forest placed under his charge." . . . . "Natural reproduction is effected by a gradual removal of the existing older stock. If a forest tract be suddenly cleared, there will ordinarily spring up a mass of coarse herbage and undergrowth, through which seedling of the forest growth will rarely be able to struggle. In the case of mountain forests being suddenly laid low we have also to fear, not only the sudden appearance of an undergrowth prejudicial to tree reproduction, but the total loss of the soil from exposure to the full violence of the rain when it is no longer bound together by the tree roots. The soil is then washed away into the valleys below, leaving a bare or rocky hillside, bearing nothing but the scantiest herbage. We must, therefore, note how nature acts in the reproduction of forest trees, and follow in her footsteps, as Pope writes:

> "First follow Nature, and your judgment frame
> By her just standard, which remains the same,
> Unerring"—

Acting on this principle, foresters have arrived at a systematic method of treatment, under which large tracts of forest in Germany and France are now managed. The forests of a division, working circle or district, are divided according to the description of the timber, and the prevailing age of the trees; and it is the aim of the forester gradually to equalise the annual yield and ensure its permanency. With this object he divides the total number of years which are found necessary to enable a tree to reach maturity, into a certain number of periods, and divides his forest into blocks corresponding with each period or state of growth. Thus, the beech having a rotation of 120 years, beech forests would be divided into six periods of twenty years each—that is to say, when the forest has been brought into proper order, there should be as nearly as possible equal areas under crop in each of the six periods, viz.—from one year to twenty, from twenty to forty, and so on. It is not necessary that the total extent in each period should be together, but it is advisable to group them as much as possible, and work each tract regularly in succession, having regard to the direction of the prevailing winds. When a block arrives in the last or oldest stage, felling is commenced by what is called a preparatory or seed clearing which is very slight, and scarcely to be distinguished from the ordinary thinning carried on in the former periods. This is followed by a clearing for light in the first year after seed has fallen (the beech seeds only every fourth or fifth year), with the objects of: First, preparing the ground to receive the seed; second, allowing the seed to germinate as it falls; and third, affording sufficient light to the young seedling. The finest trees are, as a rule, left standing with the two-fold object of depositing the seed and sheltering the young trees as they come up. If there be a good seed year and sufficient rain, the ground should be thickly covered with seedlings within two or three years after the first clearing, nature being assisted when necessary by hand sowing, transplanting from patches where the seedlings have come up very quickly to the thinner spots, and other measures of forest craft. When the ground is pretty well covered, the old trees are felled and carefully removed, so as to do as little damage as possible to the new crop, and the block re-commences life, so to speak, nothing further being done until the first thinning. The above is briefly the whole process of natural reproduction, which is the simplest and most economical of all systems, and especially applicable to forests of deciduous trees. The period between the first or preparatory clearing and the final clearing, varies from ten to thirty years, the more gradual and protracted method being now most in favor, particularly in the Black Forest, where the old

trees are removed so gradually that there can scarcely be said to be any clearing at all, the new crop being well advanced before the last of the parent trees is removed. This approximates to "felling by selection" [*jardinage*] which is the primitive system of working forests in all countries, under which in its rude form, the forester proceeds without method, selecting such timber as suits him irrespective of its relation to the forest increment. Reduced to system, it has certain advantages, especially in mountain forests, in which, if the steep slopes be laid bare area by area, avalanches, landslips, and disastrous torrents might result, but the annual output under this system is never more than two-thirds of that obtained by the rotation system, and there are other objections which it is unnecessary to detail in this paper, which have caused it to be rightly condemned, and now-a-days only retained in the treatment of European forests under peculiar or special circumstances."

THE INFLUENCE OF FORESTS ON CLIMATE.

All recognised authorities on climatology are practically agreed as to the immense influence of forests upon the climate, and the almost irreparable injury inflicted upon the older centres of Eastern civilisation by the destruction of the woods, which alone rendered the soil productive and capable of sustaining a large population. The cause of the decline and depopulation of so many once fertile and highly civilised countries is admirably set forth by Prof. Schleiden, of the University of Jena, Germany. The subjoined extract from his writings is full of warning to those who by their personal experience in noting the unfavorable changes of climate and agricultural conditions in our own land, can realise that the same process of steady deterioration has already set in, in the older settled portions of this Continent:

"Almost everywhere in the great characters in which Nature writes her chronicles, in fossilised wood, layers of peat and the like, or even in the little notes of men, for instance in the records of the Old Testament, occur proof, or at least indications, that those countries which are now treeless and arid deserts, part of Egypt, Syria, Persia and so forth, were formerly thickly wooded, traversed by streams now dried up or shrunk within narrow bounds, while now the burning glow of the sun and particularly the want of water, allow but a sparse population. In contrast must not a jovial toper laugh indeed who looks from Johannisberg out over the Rhine country, and drinks a health in Rudesheimer to the noblest of the German rivers, if he recall the statement of Tacitus that not even a cherry, much less a grape, would ripen on the Rhine! And if we ask the cause of this mighty change we are directed to the disappearance of the forests. With the careless destruction of the growth of trees man interferes to alter greatly the natural conditions of the country. We can indeed now raise one of the finest vines upon the Rhine, where two thousand years ago no cherry ripened; but on the other hand, those lands where the dense population of the Jews was nourished by a fruitful culture are in the present day half-deserts. The cultivation of clover requiring a moist atmosphere has passed from Greece to Italy, from thence to Southern Germany and already is beginning to fly from the continually drier summers there to be confined to the moister north. Rivers which formerly scattered their blessings with equal fulness throughout the whole year, now leave the dry and thirsty bed to split and gape in summer, while in spring they suddenly pour out masses of snow accumulated in winter, over the dwelling places of affrighted men. If the continued clearing and destruction of forests is at first followed by greater warmth, more southern climate, and more luxuriant thriving of the more delicate plants, yet it draws close behind this desirable condition another which restrains the habitability of a region within as narrow, and perhaps even narrower, limits than before. In Egypt no Pythagoras need now forbid his scholars to live upon the beans; long has that land been incapable of producing them. The wine of Mendes and Mareotis, which inspired the guests of Cleopatra—which was celebrated even by Horace—it grows no more. No assassin now finds the holy pine-grove of Poseidon, in which to

hide and lie in ambush for the singers hastening to the feast. The pine has long since retired from the invading desert climate to the heights of the Arcadian mountains. Where are the pastures now, where are the fields around the holy citadel of Dardanus, which at the foot of the richly-watered Ida supported three thousand mares? Who can talk now of the 'Xanthus' with its hurrying waters? Who would understand now the 'Argos feeder of horses?' . . . A broad band of waste land follows gradually in the steps of cultivation. If it expands, its centre and cradle dies, and on the outer borders only do we find green shoots. But it is not impossible, it is only difficult, for man, without renouncing the advantage of culture itself, one day to make reparation for the injury which he has inflicted: he is appointed lord of creation. True it is that thorns and thistles, ill-favored and poisonous plants, well named by botanists "rubbish plants" mark the track which man has proudly traversed through the earth. Before him lay original Nature in her wild but sublime beauty, behind him he leaves the desert, a deformed and ruined land; for childish desire of destruction, or thoughtless squandering of vegetable treasures, have destroyed the character of nature; and man himself flies terrified from the arena of his actions, leaving the impoverished earth to barbarous races or animals, so long as yet another spot in virgin beauty smiles before him Here again in selfish pursuit of profit, consciously or unconsciously, he begins anew the work of destruction. Thus did cultivation, driven out, leave the East and the deserts perhaps previously robbed of their covering. Like the wild hordes of old over beautiful Greece, thus rolls this conquest with fearful rapidity from East to West through America, and the planter often now leaves the already exhausted land, the Eastern climate becoming infertile through the demolition of the forests, to introduce a similar revolution into the far West. But we see, too, that the nobler races or truly cultivated men, even now raise their warning voices, put their small hand to the mighty work of restoring to Nature her strength and fullness in yet a higher stage than that of wild nature; one dependent on the law of purpose given by man, arranged according to plans which are copied from the development of manhood itself. All this, indeed, remains at present but a powerless and for the whole, an insignificantly small enterprise, but it preserves the faith in the vocation of man and his power to fulfill it. In future times he will and must when he rules, lead and protect the whole, free Nature from the tyrannous slavery to which he now abases her, and in which he can only keep her by restless giant struggles against the eternally resisting. We see in the gray cloudy distance of the future a realm of peace and beauty on the earth and in nature, but to reach it must man long study in the school of nature, and before all free himself from the bonds of that exclusive selfishness by which he is actuated."

Elisee Reclus, the eminent French geographer, in his work, "La Terre," treats of the climatic influence of forests as follows:

"One may say in general terms that the forests are similar to the sea in their influence, reducing the natural differences of temperature in the different seasons, while the destruction of forests increases the difference between the extreme heat and the extreme cold, imparts greater violence to atmospheric currents and to torrential rains, and a protracted violence to drouths . . Marsh fevers even and other epidemic diseases have often made an irruption into a district when woods or simple screens of protecting trees have fallen before the axe. As for the water flow, the climatic conditions on which it depends, one cannot doubt for a moment that the clearing away of woods has had the effect of disturbing its regularity. The rain which the interlaced branches of the trees allow to fall drop by drop, and which would swell up the spongy mosses upon which it fell, or which would trickle slowly across the dead leaves and the long fibrous masses of the roots, flows away at once with rapidity over the soil to form temporary streamlets, in place of sinking into the ground to descend to the depths and rise again in fertilising springs, or glides rapidly along the surface, and goes to lose itself in rivers and floods. The ground above becomes arid in the same proportion as the running waters increase below. The full rivers flowing become changed into inundations, and devastate the adjacent country, where immense disasters follow."

MR. VANDERBILT'S FOREST AND NURSERY.

It is interesting to note that in some directions the efforts of the government to preserve or restore the forests, are being seconded by private enterprises on a large scale. One of the most notable of such undertakings in the United States is the extensive forest estate and nursery of George W. Vanderbilt near Biltmore, North Carolina, now being laid out. The design is that the greater portion of the estate shall be occupied by a systematically managed forest, principally comprising such trees and bushes of indigenous growth as are of commercial value. Its extent will be fully 4,000 acres. A portion of the area is at present covered by second growth timber which will be thinned out, and considerable spaces now bare or occupied with undesirable trees will be planted. Roadways will be constructed through the forest, an eye being had to picturesque effect as well as to convenience. It is proposed to make a plantation three or four miles in length along the borders of some of the forest roads which will contain specimens suitably classified and arranged for study of each of the native trees of the region, as well as of all trees obtainable from any part of the world, which can be expected to flourish under the prevailing conditions of soil and climate. This will be styled "the Arboretum," and if the design is successfully carried out will be a collection of great scientific value and practical interest.

In some of the glens of the estate it is proposed to form landscapes of local scenery resembling those naturally prevailing in many similar situations in the North Carolina mountain region, of which the more notable features are lustrous, smooth-leaved evergreens, such as the Rhododendrons and Kalmias, Ilexes and the Lencothœ. With these will be associated a smaller number of foreign bushes of a similar character, the introduction of which if they can be successfully naturalised, will add a pleasing variety to the prospect. The partly flooded or water soaked areas which are overgrown with cane, bull-rushes, sagittarias and other aquatic forms of vegetation, will be diversified by the introduction of a few foreign plants of like nature such as certain Bamboos, Nelumbiums and Nymphæas, to the cultivation of which the surroundings are favorable.

In the nursery there are under propagation or already in cultivation young trees and bushes in very large variety. Of those designed to be set out or used as stocks for propagation for the Arboretum, there are two or more specimens each of 4,200 species and varieties. The whole stock of trees and bushes of merchantable size numbers about 100,000, and of seedlings and cuttings propagated on the grounds during the last season about 500,000. Some of the stock has been brought from long distances, as the Alpine regions, Europe, the Ural and Himalayan ranges of Asia, and Japan have all been laid under contribution. The undertaking is one the results of which can only be realised after many years, and in devoting a portion of his superfluous wealth to so worthy an object, and one quite beyond the reach of individuals or institutions not having very extensive resources at their command, Mr. Vanderbilt has set a worthy example to his fellow-millionaires.

NATIONAL PARKS AND FOREST PRESERVES.

Considering that it is only a very few years since the belief was general that this continent possessed a practically inexhaustible supply of timber, and all idea of preserving the forests for the benefit of future generations was pooh-poohed as absurd and unnecessary, it is very gratifying to note the marked awakening of public sentiment to the need of forest preservation, as indicated by government action both in Canada and the United States There is perhaps no practical question on which popular opinion has advanced more rapidly. In the United States, where the timber supply has been more nearly exhausted by reckless cutting than is yet the case in Canada, it is conceded on all hands that the time has arrived to call a halt to the work of devastation and take energetic

measures to protect the remaining woodlands. An earnest of this great change in public feeling is seen in the very comprehensive forestry measures which have resulted in the setting apart as national forest reservations the Yosemite, Yellowstone, and Sequoia Parks in the west, and the similar movement in New York State to secure from spoliation the great forests of the Adirondacks covering the region in which the rivers of that state take their rise. The Dominion Government a few years ago took similar enlightened action in reserving the beautiful Rocky Mountain Park at Banff, in the North-West, where a large area of magnificently timbered land has been set apart as a health and pleasure resort, and strict regulations adopted to preserve the timber within its boundaries.

In thus withdrawing large areas of wild land from private ownership unadapted for permanent settlement or successful cultivation, and preserving them as public domains, several useful and essential purposes are served. The most important of these is unquestionably the preservation of the natural forest from the ravages of the axe and fire, doing something to retain a due proportion of woodland to avert the evils resulting from the excessive denudation of the country. The advantages which these reserved areas will afford as sanitariums, and resorts for those in search of rest and recreation are obvious. There the many species of game and other varieties of wild animals and birds which might otherwise speedily become extinct will be carefully preserved, and in after ages the scientist and student of nature will be enabled to form an idea of the primæval condition of the country.

There are in the Northern portion of Ontario extensive regions, partially timbered, which except in patches here and there are entirely unfitted for successful cultivation on account of the rocky and broken character of the ground. This region includes the head waters of the principal rivers and streams of Ontario, and the extent to which it has been devastated by timbering and forest fires has resulted in very considerably reducing the volume of water. Every consideration points to the desirability of the Provincial Government laying out a large area in the northern section of the Province to be withdrawn from settlement and retained as a Provincial Park, under strict forestry management.

FORESTRY IN THE U. S.—NATIONAL PARKS.

The annual report of the United States Secretary of the Interior for the fiscal year ending June 30th, 1891, shows that the question of preserving the forests from destruction in order to secure an adequate supply of timber in the future, and to prevent the recurrence of floods and drouths, is receiving increased attention at the hands of the American Government. Owing to the rapid settlement of the public lands adapted for agricultural purposes, the irrigation of the arid regions of the West, so as to render them available for cultivation, has become an important problem. It is estimated that 120,000,000 acres now desert may be redeemed by irrigation so as to produce the grains, fruits and vegetables otherwise adapted to the locality. The close connection between the systems of forestry and irrigation is indicated by the following passage in the report:

"Connected with the water supply of the arid regions, is the necessity at this time of making systematic reservations from settlement of public lands about the heads of the streams that make irrigation possible. Indeed such reservations should be made for all our streams, but especially for those above referrred to. If the timber growth is removed, without consideration for the future, the periods during which the streams give their present supply of water will be greatly shortened by floods and drouths."

The more consideration which is given to the now urgent problem of irrigation as a means of enlarging the cultivable area of the United States, the greater will appear the absolute necessity of insisting upon forest preservation as an essential factor in securing a steady and copious water supply. The report calls attention to a very serious mistake made by the Government in permitting the passage of an act to repeal timber-culture

laws, which contains the remarkable provision that in the States of Colorado, Montana Idaho, North Dakota, South Dakota, Wyoming, the District of Alaska and the gold and silver mining regions of Nevada and Utah, in any prosecution for a trespass on public timber lands, "it shall be a defence if the defendant shall show that the said timber was so cut or removed from the timber lands for use in such state or territory by a resident thereof for agricultural, mining, manufacturing or domestic purposes, under rules and regulations made and prescribed by the Secretary of the Interior, and has not been transported out of the same." According to this very sweeping and comprehensive provision the only safeguard remaining for the timber in the states included are such regulations as the Secretary sees fit to enforce, as no one could cut timber for any purpose not coming under the head of "agricultural, mining, manufacturing or domestic," unless it were in mere wantonness. The relaxation of the law is stated to have resulted in a very large number of applications for permits to cut timber, and it is anticipated that the rapid increase in these will, unless the law is repealed or modified, leave but little timber in these regions to protect. As an available means of preventing or postponing so undesirable a result the report calls attention to a clause of the Act under which the President is empowered to set apart and reserve any part of the public lands wholly or partly timbered as public reservations. If this authority is freely exercised it may prevent the threatened calamity. Action was taken under this law on March 30th and September 10th, 1891, when the President proclaimed a reserve about the Yellowstone National Park, which it is recommended should be annexed to that valuable national possession, and on October 16th, 1891, when the White River Plateau in Colorado, embracing the head waters of the White, Grand and Yampa rivers, was proclaimed a reserve. The report recommends that Congress take proper action to have the reservations that are constituted by the President established as national parks or granted to the States in whose borders they are situated, to be preserved unimpaired and used for the benefit of the public only. The American Forestry Association, and those interested in forestry have petitioned to have other reserves made, and the Commissioner of the General Land Office and the Director of the Geological Survey are making investigations upon which to base further recommendations. It is to be considered that these parks would preserve the fauna, fish and flora of the country, and become resorts for those seeking instruction and recreation, at the same time that they serve important agricultural and economic purposes. It is urged that details from the army should be authorised to guard the reserves from early spring to late autumn, or that a police force for that purpose should be employe l, and that penalties against violation of the rules and regulations made to govern the reserves should be enforced.

During the year 488 cases of depredation on the public lands involving timber and its products to the value of $2,347,473.11, of which a total of $116,704.57 was recovered either by accepting propositions for settlement or through legal proceedings. On the 1st of July, 1891, there were pending in the courts 203 civil suits for the recovery of an aggregate amount of $4,451,305.07 for the value of timber unlawfully cut from public lands, and 361 criminal prosecutions for the cutting or removing of timber in violation of law. The appropriation to meet the expenses of protecting timber on the public lands amounted to $100,000,

Among other details as to the condition of the forests of the territories given in the report are the following: The fine forests of Northern and Central Arizona cover an area of 1,750,000 acres, and there is an abundant supply of timber for the consumption of a large population for a great number of years. The expense of transportation renders the price too high for competition with outside markets. Ten thousand millions of feet is the estimate made as to the quantity of pine timber fit for sawing purposes. It is urged that as the future agricultural development of the territory depends largely upon an abundant and permanent supply of water, which in turn depends on the proper preservation of the forests, legislation should be framed to preserve the present timber-growing areas.

In New Mexico the extension of the Union Pacific Railroad into the Red River country and on the Maxwell grant brought into the market about 200,000,000 feet of

spruce and pine timber, and there are now seven mills in operation, cutting about 3,000,000 feet per month. Besides the sawn lumber there are about 20,000,000 ties and other timber already in reach. In other sections vast quantities were cut during the year, 20,000,000 feet being cut from the Tierra Amarilla grant. The proposal to establish a national park on the Upper Pecos to protect the timber about its head waters is strongly urged.

In Alaska dense forests and abundance of timber are found. Spruce, hemlock, cedar, birch and poplar being the principal growths. The timber business is much harrassed by the unfortunate condition of the land titles. The depredations reported during 1890 amounted to 10,000,000 feet, worth $250,340.

The report, in dealing with the Yellowstone National Park, regrets the absence of any law to punish depredations there. The attention of Congress has often been called to the subject, and a penal statute introduced, but coupled with an amendment foreign to its purpose, granting the right of way to a railroad through the park, and those instrumental in urging the Bill thought it better it should fail than pass with such a provision. The Secretary of the Interior considers that a railroad would be detrimental to all the purposes for which the park was established, and that if the franchise were once granted it would result in the practical abandonment of that region as a forest and game reserve. A large tract of forest land lying to the South and East of the park in the State of Wyoming has been reserved from settlement by the President, and Congress has been asked to include it in the boundaries of the park.

The Yosemite National Park includes among its forest growths nine varieties of pines, growing at all elevations, from 2,500 to 11,000 feet above sea level, the tamarack flourishing at the highest altitude of any. The cedar grows to great dimensions, at from 4,000 to 7,000 feet. Two varieties of spruce grow at from 5,500 to 8,000 feet altitude, and three varieties of the fir at from 7,000 to 9,000 feet. At an altitude of about 8,000 feet, specimens of the juniper have been seen. The black and live oak grow in the valley, only at 4,000 above sea level, at which height there are also a few cottonwood and balm of gilead trees. At 5,000 to 6,000 feet are a few dwarf quaking aspen. There are two small groves in this park of the wonderful *sequoia gigantea* which is indigenous at elevations between 5,500 and 7,000 feet. The same difficulty in management presents itself here as in connection with the Yellowstone Park, owing to the absence of laws providing criminal penalties for violation of the regulations.

The Sequoia National Park has been put in a condition to preserve the celebrated *sequoia gigantea* (from which it is named) from injury or destruction. The Giant Forest, as the sequoia groves are termed, is in its natural state except for a few cabins and some fenced ground. One tree is thirty-four and a-half feet in diameter, and 370 feet in height. In other groves, the sequoia trees form but a small proportion of the forest growth, being scattered here and there among fir, spruce and pine trees. In the Giant Forest they are the majority, and grow more thickly and to a greater size than anywhere else in California. It is the most remarkable forest of its kind in the world. The Superintendent of the park states in his report that the prosperity of the population living in the valley between the Sierra Nevada's and Coast Range depends upon the preservation of the timber and brushwood in the mountains, the brushwood covering the lower slopes and foothills to an altitude of about 5,500 feet where the timber commences, and extending to between 10,000 and 11,000 feet, where there is enough soil to support the trees. The brush and timber assist in holding back the snow and prevent disastrous snow slides, and also keep it from melting too rapidly in the spring, thus preventing floods and equalising the water supply. Sheep destroy much of this brush, and herders often set fire to it in the fall in order that the ground may furnish a good supply of grass next season. Protection against this evil must be sought from the national or state government.

The following memorial from the American Association for the Advancement of Science, relating to the preservation of the forests on the public domain was, on January 20th, 1890, transmitted by the President to Congress, with an earnest request that legislation to that end might be provided, a recommendation which was partially complied with.

Memorial of the American Association for the Advancement of Science in Behalf of a Proper Forestry Policy.

To the President of the United States:

The first national legislation which recognised the necessity of looking after the forestry interests of the country in general, grew out of the representations made before Congress fifteen years ago by a committtee of the American Association for the Advancement of Science.

These representations led to the appointment in the year 1887 of an agent, and later, the establishment of a forestry division in the Department of Agriculture, for the purpose of gathering and making accessible such information as would lead our people to a proper conception of the value and significance of a forest cover in the economic life of our nation.

Twelve years have passed, during which sufficient knowledge of our forest conditions and of the general relations of these to cultural, climatic, and economic conditions has been gathered, to show that further action on the part of the General Government is necessary if we wish to preserve this relation favorable to the future development of the country.

The American Association for the Advancement of Science, actuated alone by a desire to promote a rational development of the country's resources, has therefore appointed the undersigned committee to memorialise the President and Congress of the United States under the following resolution:

"*Resolved*, That it is the sense of the American Association for the Advancement of Science that immediate action should be taken looking to the establishment of a proper administration of the remaining timber lands in the hands of the Government of the United States and Canada, for the purpose of insuring the perpetuity of the forest cover on the western mountain ranges, preserving thereby the dependent favorable hydrologic conditions.

"*Resolved further*, That a committee of five be, and is hereby, appointed to present this resolution, and to urge the importance thereof to the President and the Congress of the United States, and to the Premier and Parliament of Canada and of the provincial governments, and that such committee be instructed to prepare in proper form any data necessary, and to use every honorable means to accomplish the purpose herein set forth, and that the President of this Association be hereby appointed chairman of such committee, together with four others whom he shall appoint."

The committee in presenting this memorial desire not to argue at length any theory as to forest influences, or to discuss the present unsatisfactory condition of our forest areas and national timber lands—which has been amply done in the reports of the Secretaries of Agriculture and of the Interior—but they respectfully submit in support of the request of the Association such points as will explain and justify the presentation of this memorial.

(1) The action which is asked of Congress concerns only a particular part of our forest area, that part which is in possession of the General Government, the property of the nation.

(2) It is asked upon the presumption that the present administration of this property, probably from ignorance of its proper value and its real significance, is unsatisfactory, and that a change of policy is immediately urgent if this value is to be retained, and the far-reaching injury, which from its present rapid deterioration may be anticipated, is to be avoided.

(3) It is asked upon the presumption that the value of the property, situated mainly upon the watersheds of our Western river systems, lies much more in its significance for the future cultural development of a vast adjoining country than in the material which it now furnishes to the pioneer settler and miner.

(4) It is also assumed that the only proper person to administer this property for the benefit of the country at large, and the preservation of the dependent cultural conditions is the Government itself, which alone can have an interest in the future of society beyond present and personal gain.

As the reports cited have shown, the administration of the timber lands has been unsatisfactory for lack of proper legislation and of provisions sufficient to protect this property against material loss and deterioration. Timber thieving and destruction by fire have been allowed to unnecessarily waste this national property, while the officers in charge were powerless to protect it. The pioneer legislation, which may have been sufficient twenty-five years ago, has long outlived its usefulness, and should make way for such administration as will meet the demands of civilized existence in settled communities.

A vast empire, considered useless not long ago, has been found capable of human occupancy and agricultural production, if the means for its development, water, can be brought upon it, and the extent to which this land may be utilized depends upon the amounts of water available.

The opinions of our greatest climatologists have been divided as to the influence of forests on precipitation. But evidence, carefully and scientifically scrutinised, is accumulating which tends to show that, under certain conditions at least, such influence may not be improbable. However this may be, overwhelming evidence can be brought to show that a potent influence upon the distribution of available water supplies from rain and snow is exerted by a forest cover, so that a government having to deal with the problem of cultural development of a part of its domain by irrigation can not compass the water question without at the same time giving attention and proper regard to the forestry question.

Removal of the mountain forest means invariably disturbance of the natural "run-off;" favorable sometimes, unfavorable mostly.

It may be difficult to devise at once such a plan for the administration of these forests, with a view to their continuity, as can be put in practice under the present social and political conditions of that part of our country in which this timbered area is situated; and a special investigation of these conditions and careful adjustment between the present needs of the population for wood material and the future needs of a forest cover for hydrologic purposes appears desirable, although various measures for a forest administration which seems capable of practical application have been proposed.

We, therefore, the undersigned committee, in the conservative and scrutinising spirit that should characterise the proposition of the scientific body which we represent, respectfully recommend:

That a joint committee of the Senate and House of Representatives of the United States, be appointed to consider the needs of legislation in behalf of the public timber domain, with a view of providing for the appointment of a commission of competent men, salaried and employed for this service alone, for the purpose of investigating the necessity of preserving certain parts of the present public forest area as requisite for the maintenance of favorable water conditions, and to devise a practical plan for the permanent administration of such parts of it as shall appear desirable to be retained under Government control.

The committee further recommends that, pending such investigation, all timber lands now in the hands of the United States be withdrawn from sale and provision be made to protect the said lands from theft and ravages by fire, and to supply in a rational manner the local needs for wood and lumber until a permanent system of forest administration be had.

It is also suggested that inasmuch as the various Departments and Government Bureaus, namely, the Department of Agriculture in its Forestry Division, the Department of the Interior in its Land Office and Geological Survey, the Department of War in its Signal Office, the Treasury Department in its Coast and Geodetic Survey, are more or less closely interested in this matter, and have collected data useful in the work of such a commission, these Departments should co-operate and act as advisers of said commission.

T. C. Mendenhall,
President of the Association and Chairman.

B. E. Fernow, of New York,
Secretary.

E. W. Hilgard, of California,
C. E. Bessey, of Nebraska,
Wm. Saunders, of Canada.
Committee.

THE PROPOSED ADIRONDACK PARK.

The fifth annual report of the Forest Commission of the State of New York, for the year 1890, comprising Messrs. Townsend Cox, Sherman W. Knevals and Theodore B. Bassolin, embodies a considerable amount of valuable information as to the work of the Commission in connection with the Adirondack and Catskill forest preserves in that State, and the more comprehensive scheme of the contemplated Adirondack Park. The report states that the remarkable exemption from fire, so noticeable in 1888 and 1889, has continued during 1890. As before, it is undoubtedly due in a large extent to the rules and regulations which have been thoroughly posted throughout the Adirondack and Catskill preserves, and to the vigilance of the fire wardens. The widespread distribution of these printed rules of the Commission regarding the use and abuse of fire has reduced the prevalence of dangerous fires to a minimum, while the efficient organisation of the fire-warden system, under which one or more active officials are ready at all times for duty in each town (the New York "town" corresponds to the Canadian township) has prevented the fires, when started from doing any serious damage.

The rules and regulations for the prevention of forest fires are printed on heavy cards twelve by fifteen inches, or latterly upon white muslin, as this material has proved more durable, most of the placards being posted in the woods, or on fences, schoolhouses and mills, where they are exposed to the weather. Over 15,000 of these rules have been posted by the foresters and firewardens throughout the preserve counties, and the Commission believes that much of the immunity from fire is due to their general distribution. They have been an important aid in warning the careless and in educating the people in this particular. The rules are as follows:

Rules for the Prevention and Suppression of Forest Fires and for the Protection of Forest Trees.

1. All persons intending to light fires for the purposes of clearing or improvement must give notice of their intention to the nearest firewarden before such fire is lighted.

2. No fires of the character before specified will be permitted until the trees are in full leaf. After such fires are lighted competent persons must remain to guard them until the fire is completely extinguished.

3. Fires will be permitted for the purpose of cooking, warmth and insect smudges; but before such fires are kindled, sufficient space around the spot where the fire is to be lighted must be cleared from all combustible material; and before the place is abandoned fires so lighted must be thoroughly quenched.

4. All fires other than those hereinbefore mentioned, are absolutely prohibited.

5. Hunters and smokers are cautioned against allowing fires to originate from the use of firearms, cigars and pipes, and all persons are warned that they will be held responsible for any damage or injury to the forest which may result from their carelessness or neglect.

6. Felling trees and girdling or peeling bark from standing trees are prohibited. Fallen timber only may be used for firewood and camp construction.

7. Foresters and firewardens are instructed, and all citizens are requested, to report to the forest commissioners immediately all cases of damage or injury to forest trees arising from a violation of these rules, which may come to their knowledge.

Since the publication of the previous report trespasses on State lands throughout the forest preserves have continued to diminish in number and extent, a result due in part to increased vigilance in protecting timber lands, but owing largely to the change in public sentiment among the people living in the timber district in regard to the custom of cutting timber on State lands.

The Commission report a total expenditure of $24,891.20, being $5,108.80 less than the appropriation of $30,000 for the work. Although since 1888 the area of State holdings has been largely diminished by the redemption of lands forfeited for non-payment of taxes, these losses have been more than compensated by accessions, and there has been a net increase of 81,149 acres in the area of the preserve since the Commission took charge, the area on December 31st, 1885, being 715,267 acres as compared with 796,416 acres on January 1st, 1891.

The report embraces a special report made by the Commission to the State Legislature dealing with the message of Governor Hill, which called attention to the subject of establishing a State Park in and about the head waters of the rivers having their sources in the Adirondack wilderness, and was referred to the Forest Commission with instructions to investigate the possibilities of such an undertaking and report their recommendations as to the most effective methods to accomplish it. The regions popularly known as the Adirondacks is one of undefined extent.

In years gone by the wild lands of the Adirondacks have been stated to cover 12,000 square miles, which was doubtless an over estimate, and included lands not properly belonging to the Adirondacks tract. Villages, settlements, farms and clearings have been established all around its borders, and have made large encroachments upon the original acreage. Taking the most reliable data obtainable the gross area of the Adirondack wilderness proper is shown now to be about 5,600 square miles, or 3,600,000 acres, which includes the area of water, everflowed lands, clearings, farms, and some villages or settlements. Of this estimated gross area of 3,600,000 acres the State has acquired title to a total area of 765,036 acres inclusive of water and overflowed lands. This is not compact, but lies in widely separated parcels, varying in extent and interspersed among tracts held by individuals and corporations, some of whom have established private preserves and parks in the woods for purposes of pleasure and recreation. There must be some scheme adopted by which an area could be consolidated sufficiently large to render the establishment of a park expedient. The Commissioners consider the exercise of the right of eminent domain at present impracticable, as it would arouse hostility and defeat the entire park scheme. They regard the proposal to purchase the lands held by private owners as more feasible, though widely conflicting opinions as regards the amount required for the purpose were found to prevail.

While public opinion as a whole has been from the first strongly in favor of the park, objections to it have come from two classes of people, as was anticipated, though not very strongly or definitely expressed. The first class of possible opponents are the clubs and various associations and individuals who are holding land in the Adirondacks for purposes of pleasure or as summer resorts.

The number of these has greatly increased since the agitation of the park scheme, These private reserves being mostly held by men of means, are not for sale. Another class from whom objection was anticipated are those interested in lumbering and paper-making. The State holdings are interspersed among and bounded on every side by immense tracts held by timber dealers and paper-makers, who have paid for their lands and have built saw-mills and pulp-mills and dams and other structures at a great expenditure

of money. It became evident that there must be devised some system of adjustment and *modus vivendi* between the State on the one hand and those owning private reserves and lumber lands on the other, under which the park could be established, leaving the rights and privileges of all undisturbed. With this end in view the Commission invited representatives of all private interests to present their opinions and informally discuss the entire subject in all its bearings. The fact was elicited that the owners of private reserves were unanimously in favor of the park, provided certain privileges were conceded them. The claims made on behalf of the private reserves are that while the aim of their establishment may differ from that of the State park they are practically accomplishing the precise object sought, viz., the preservation of the forest.

With one or two exceptions timber is not allowed to be cut, fire is guarded against and no acts of depredation or trespass allowed. The Commission came to the conclusion that the chief objectionable feature of the reserves, the exclusion of the public from private reserve lands, can be by negotiation and mutual concession removed, and that it does not seem to be essential to the full success of the park scheme that the State should immediately acquire the lands included in the private reserves, it being of less consequence who shall preserve the forests than that they should be preserved. The real purpose can be served by an agreement with the owners of the reserves that their lands shall be managed under the same system and subject to the same regulations as the park, the title to remain for the time in the present owners as an offset to a concession on their part that the public shall have access to their lands, and that if they are ever offered for sale the State shall have the refusal to purchase.

As to the lands held by lumbermen it is essential that much of that area should be eventually owned by the State, and there should be a method inaugurated, having for its object the gradual acquisition of lands for the park as opportunities arise.

Many parcels of land, some fairly well covered with timber, lie scattered in small tracts so far from the main body of the Adirondack lands as to be unavailable for park purposes. These lands can be exchanged, on a fair business basis, for lands within the proposed park area now owned by individuals. Still further, it is proposed that the State acquire title to land now owned by lumbermen within the proposed park area, under condition that the "soft wood" (thereby meaning spruce, hemlock, pine and tamarack) may be cut and taken out within a specified time, under conditions to be established. The mature timber standing on the land owned by the State might be exchanged under conditions of a like sort, for lands desirable to be enclosed within the State park. In this way the land on which such growing timber stands could be retained by the State, and new lands acquired, which, in a few years in the course of nature, will be recovered with a new forest growth.

The report points out that the true interests of the lumbermen are not incompatible with forest preservation. Under the old practice of cutting the forests have rapidly disappeared, and if it continues in a few years none will be left. The lumberman will have ruined his own business. It is the purpose of forestry to point out to the lumberman the true methods of exercising his own profession, which will provide him material for the future as well as the present by maintaining permanent forests through a succession of crops. The lands acquired for the park can be, doubtless, brought under a system of good forestry management and permanent forests established thereon.

The Commission believes it to be good policy for the State to acquire timbered and even denuded lands for park purposes, since these lands can be obtained at a small cost, and it is a well-established fact that if a tract of cleared or even cultivated land is for any considerable length of time abandoned and kept free from destructive agencies the forest re-asserts itself, and the soil is soon covered with an arborescent growth.

The minimum area for a park suggested to the Commission is 1,600 square miles or about 1,000,000 acres, while most have urged larger areas ranging from 2,500,000 to 4,000,000 acres. The actual size must depend ultimately upon the liberality of the legislature, and this in turn will depend largely upon public opinion. According to the scheme recommended by the Commission the park includes a gross area of 2,307,760 acres, of

which 54,104 acres are water, 64,717 acres improved lands, 341,207 private reserves, and 512,229 acres State lands. Deducting these would leave 1,332,503 acres necessary to be acquired by the State for the completion of the park. Provided the State should wish to acquire the main body of land regarded as properly belonging to the Adirondack wilderness and suitable for a forest preserve, the total area would amount to 3,588,803 acres, of which 2,430,941 would be necessary to be acquired by the State.

The report, after presenting a number of very forcible sanitary and economical reasons for the establishment of the proposed park, goes on to say:

"The loss to the State of New York, which would be entailed by the destruction of the Adirondack forests, taking into account the manufacturing and canal interests involved, could only be counted by millions of dollars, and this without taking into consideration the loss to the health of our citizens by the removal of the most valuable of all sanitariums and the destruction of the valuable game preserves of the Adirondacks. . . The Commission regards it of the utmost importance that the State should acquire title to all the forest lands within the limits of the park, which it is possible to acquire, in the shortest practicable time. It desires further to indicate in the most emphatic way the strong claims that the subject of forest preservation involved in this measure has upon the attention of the legislature, and to urge prompt and liberal action. It is no temporary device that is here under consideration, affecting small interests within narrow limits, but a far-reaching measure, involving the prosperity of the whole State, and having regard to its welfare for all time. On behalf of the people of the State we appeal to you for the immediate enactment of such laws as shall seem to you judicious and effective to save our forests from destruction."

The Commission make a rough estimate of the cost involved in carrying out their proposal, which they think will not exceed from $3,000,000 to $3,500,000.

The report, which concludes by recommending a Bill to give legislative sanction to the scheme, contains many suggestions and recommendations in regard to the formation and management of a forest preserve which may be found available for our guidance in dealing with the wooded sections of Ontario, around the head waters of our larger rivers, when we are driven by force of circumstances to adopt a similar measure for their preservation.

FORESTS EQUALISE THE TEMPERATURE.

The *Rapports Annuels de Meteorologie Forestiere*, the leading French authority on the subject, treating of the effect of forests on the temperature, point out that they tend to moderate the severity of heat and cold by equalising the temperature. In a country like ours, where both extremes prevail, according to the season, this is a specially valuable function:

"In a forest the mean temperature is always lower than it is in a denuded country; but the difference is less marked in winter than in summer; the maximum temperatures are always lower, and the minimum temperatures are always higher. In a forest the reduction and increase of temperature always advances more slowly; the temperature there is always more equal in the day, and in the night, between one day and another, and from season to season; sudden changes of temperature, if they do not last long, do not make themselves felt, from all which we are warranted in concluding that forests tend to keep down the general temperature of a country. On the other hand, they tend to diminish the degree of sudden changes and to avert thunder storms."

FORESTS AND EVAPORATION.*

In view of the fact that the highest scientific authorities are in accord as to the effect of forests in very considerably lessening the amount of evaporation, and so preserving the moisture and mitigating the effect of drouths, and that this opinion is fully borne out by statistics gathered from careful and elaborate observations in different countries, it is somewhat surprising at this late day to see the opposite notion put forward in the name of science by one holding a prominent official position. The utterances of Major Powell, Director of the United States Geological Survey, on this subject have perhaps attracted more attention than their intrinsic merits deserve, owing to their embodying a view so entirely contrary to the generally accepted conclusions of modern climatological research. Owing to the official position which Major Powell occupies, his observations are likely to do a good deal of injury to the cause of forestry by giving countenance to the idea that the clearance of mountain forests is an advantage rather than a detriment to cultivation, and supplying those who are interested in denuding the country with a semblance of argument in favor of such a course.

In the April number of the *Century* magazine for 1890 Major Powell has an article on "The Non-Irrigable Lands of the Arid Region," written with a good deal of descriptive power, and containing much valuable information. While admitting the general importance of forest preservation, both from an æsthetic and utilitarian standpoint, he endeavors to show that "factitious reasons are given which detract from the argument for the preservation of the woods"—having special reference to the point so frequently urged as to value of forests in diminishing evaporation and acting as a reservoir of moisture. On this subject Major Powell says:

"In humid lands, where rivers flow on to the sea because they are not needed on the fields, the problems relating to the streams are of another character. There the floods are destructive, and every condition which favors their diminution is an advantage. Vegetation lives on water. The roots drink it, and the leaves return all that is unused to the air, where it may float away to form clouds in other regions. A vigorous plant will thus evaporate two or three hundred times the weight of its annual growth. Then a great tree spreads, through the agency of its leaves and branches, a vast surface to the air and the heat of the sun. Altogether no inconsiderable portion of the precipitation of a region is thus returned to the heavens, and so fails to find the rivers. The subject has been more or less studied, but it is complex, and the result cannot be simply stated, for the variables are many. Perhaps it is safe to say that from twenty to forty per cent. of the rainfall of a region may be dissipated in this manner. It is manifest that such a loss from the streams is of no small importance in a humid region, and it is for this reason that the preservation of mountain forests in such lands is often strongly urged. But when the streams have a value which increases with their volume, the economic aspect of the problem is at once reversed. Researches on this subject made in the Wasatch Mountains and elsewhere by scientific men show that a great increase in the volume of the streams may accrue from the denudation of the mountains of their evergreen garments. There is still another condition which tends in this same direction. When the mountain declivites are grassy slopes, the snows of winter drift behind ledges and cliffs, and into great banks among the rocks, and they fill ravines and cañons, and are thus stored in compact bodies until they are melted by the summer suns and rains. But when forests stand on the slopes the snows are spread in comparatively thin sheets, and great surfaces of evaporation are presented to the sun and the wind. For all these reasons the forests of the upper regions are not advantageous to the people of the valleys, who depend on the streams for the fertilisation of the farms."

*This article was kindly contributed by Colonel Pearson of Wales, England. His statements may be depended upon, as he was for a long period one of the chief forestry managers in India under the British Government.

The same utterly erroneous and unscientific view is presented in a paper by Major Powell, which appeared in the *North American Review* for August, 1889, entitled "The Lesson of Conemaugh," dealing with the Johnstown flood. In this article Major Powell says:

"In the construction of reservoirs in the arid regions there are important problems not pertaining to humid regions. To a large extent the sources of the water are in high mountains, when the chief precipitation is snow, which, to some extent, stores itself in snow-banks and glacial fields, to be melted by the summer sun at the time when irrigation is required. The upper portions of these mountains are largely treeless—a condition favorable to the storage of snow. In a forest region the snows are evenly distributed over the entire surface, and are quickly melted when the summer rains and suns come; but in a treeless region the snows are accumulated in great drifts in the lee of rocks and cliffs, and under the walls of gorges and cañons. Such great drifts are themselves stupendous reservoirs of water, and artificial works are necessary only to control the flow properly and distribute the water at the places and times needed. Wherever the chief precipitation is snow, forests are a disadvantage if the waters are needed in the valleys below for irrigation, for the forests keep the snow distributed over broad areas of ground, and expose it to the winds on their trunks, branches and leaves, so that altogether the mountain evaporation is enormously increased, as compared with the evaporation from snow-drifts and ice-fields."

In the first place it will be noticed that all this is mere theorising. Major Powell does not attempt to quote even a single isolated fact in proof of his absurd contention. There have been abundant instances in which mountains formerly well-wooded have been denuded of their forest-covering. The effect upon the streams has indeed been marked, but it has been the very reverse of the result which Major Powell's conclusions would indicate. Instead of the volume of the streams having increased owing to the lessening of evaporation it has invariably diminished. If Major Powell had quoted a single specific instance in which the stripping of a mountain slope of its timber had resulted in the increase of the volume of water in the streams fed by the district formerly wooded, his theory might have been worthy of some consideration. But he does not attempt to do so. The facts are too palpably against him. He speaks, it is true, in a very indefinite way of researches made in the Wasatch Mountains by scientific men, showing a great increase in the volume of streams as the result of denudation. But he neither mentions any names, nor gives any details or statistics to corroborate his assertion, which he could very easily have done, if any scientist of recognised standing had made any observations tending to confirm his theory. Considering that Major Powell's view is directly in the teeth of all practical experience and recorded observations of climatologists of note in all parts of the world, his failure to advance a single authenticated fact in support of his hypothesis ought to be sufficient evidence of the reckless, untrustworthy character of his statements. It is extremely to be regretted that mere random assertions, such as those above quoted, lacking even the merit of plausibility, should have obtained widespread circulation, as the official position of the author gives them a factitious and misleading influence.

The weak point of Major Powell's argument is apparent to anyone even slightly versed in the principles of forestry. It is true, of course, that trees and plants give off into the air large quantities of moisture by evaporation. But while emphasising this point, the writer conveniently overlooks altogether the counteracting influence of vegetation in shielding the soil from the fierce rays of the sun and the drying effects of the wind by which the direct evaporation from the ground is immensely lessened. Neither does he take into account the yet more important influence of forests upon the character of the soil itself, increasing its porousness and permeability by a network of roots, and forming by decayed leaves and branches a *humus*, which after every rainfall becomes saturated, and forms a reservoir for the water which would otherwise flow rapidly away. What reliance can be placed in the opinions of a writer on forestry matters who is either so ignorant or so disingenuous as altogether to ignore these most important functions of the forest in its relations to the soil and climate? If Major Powell's unsupported assertion of the effect of denudation on the Wasatch Mountains in swelling the volume of the

streams has any basis of apparent fact whatever, it is no doubt founded upon inability to distinguish between the temporarily increased volume of the streams during the spring, resulting from the clearing of the uplands and the ordinary flow during other seasons. The increased rapidity with which the water flows away in spring after a country has been cleared of its woodlands is a matter of common observation. But this rush of water which swells the streams at certain seasons is always attended by a considerable diminution of the current during the greater portion of the year

The following, from "A Manual of Forestry" by Prof. William Schlich, Ph D. of the Royal Indian Engineering College, late Inspector-General of Forests to the Government of India, is a conclusive answer to Major Powell's notion as to the increased amount of evaporation in wooded regions.

EVAPORATION.

Owing to the lower temperature, the greater humidity of the air, and the quieter state of the atmosphere, evaporation must be considerably smaller in forests than in the open. This has been conclusively proved by direct observations. Those made in Bavaria and Prussia show the following results :

Stations.	Quantity of water evaporated from a free surface of water. Height in inches.			Less in forest, expressed in per cent of the total quantity evaporated in the open.
	In the open.	In forest.	Less in forest.	
Bavarian	23.53	8.61	—14.92	—63
Prussian.....	13 16	5.98	— 7.18	—55
Mean..... .	18.34	7.29	—11.05	—60

These data show that evaporation in the forest was only two-fifths of that in the open country.

The effect of this action is that of the water which falls on the ground in a forest, a considerably larger proportion is secured to the soil than in the open. That water is available to be taken up by the roots, while any balance goes to the ground water and helps to feed springs. Of considerable importance in this respect is the covering of forest soil. Dr. Ebenmayer's observations on this point, extending over five years, show the following results :

Water evaporated from soil in the open..... .....=100 parts.
Evaporation from forest soil, without leaf-mould .... = 47 "
" " " " with full layer of leaf-mould..... = 22 "

In other words, forest soil without leaf-mould evaporated less than half the water evaporated in the open, while forest soil covered with a good layer of humus evaporated even less than one-fourth of that evaporated in the open. The result of these peculiarities is, that, at any rate up to a certain elevation, the forest soil retains, after allowing for evaporation, more water than open soil, although some 23 per cent. of the rainfall is intercepted by the crowns of the trees. In order to illustrate this, the following table, taken from Dr. Weber's calculations, is inserted, as it draws the balance of rainfall over evaporation, acording to elevation ; it is based upon the Prussian observations :

Altitude of stations in feet.	Excess of rainfall over evaporation, in inches.		Percentage of rainfall which evaporated.	
	In the open.	In forest.	In the open.	In forest.
0 328	12.02	12.32	55	37
328-656	12.69	13 84	53	30
984-1312	12.20	17.65	58	25
1969-2297	36.96	30.79	22	13
2540	47.10	43.08	15	9
3050	56.77	46.34	19	11

This table shows that the balance of water retained by the soil increases rapidly with

altitude, and that the evaporation in mountain forests may be reduced to about 10 per cent. of the rainfall. If it be remembered that the moisture is most effectually preserved in forests, it will easily be understood why the mountain forests have from time immemorial been looked upon as the preserver of moisture and feeders of springs. No doubt a certain portion of the water is again taken out of the ground by the roots of the trees and evaporated through the leaves. The quantity thus consumed is not known at present, but it cannot be more than 12 inches, the total quantity available in plain forests, and probably it becomes less with elevation, so that a considerable balance remains available in hill forests for the feeding of springs.

Mechanical Effect of Forests.

The mechanical effect of forests makes itself chiefly felt in regard to the distribution of the rain-water, the preservation of avalanches, and the moderation of our currents.

Feeding of Springs and Rivers.

Most of the rainwater falling on a bare slope rushes down into the nearest water course in a comparatively short time, thus causing a rapid rise in the level of the stream. Only a comparatively small portion sinks into the ground, so as to become available for the feeding of springs. Of the rain falling over a forest, close on one-fourth is intercepted by the crowns of the trees, and the other three-fourths fall upon a layer of humus, which possesses a great capacity to absorb water and to retain it for a time. It has been shown, for instance, that mosses of the species Hypnum, which grew under the shade of conifers, can absorb up to five times their own weight in water, and peat mosses of the genus Ephagnum up to seven times, while the leaf mould to be found in a middle-aged, well preserved beech wood can absorb and retain for a time a rainfall of five inches. Part of the water thus absorbed penetrates into the ground, and becomes available for feeding springs, while the rest gradually finds its way into the nearest stream. In this manner, well preserved forests must have a decided effect upon the sustained feeding of springs and the moderation of sudden floods in rivers. When, however, the humus has been saturated with water, and rain continues, the effect of forests as regards inundations must cease, because the additional water follows the laws of gravity and finds its way into the valleys. Hence, the effects are of limited extent, a matter which has frequently been overlooked in discussing the subject. In order to moderate inundations to any appreciable extent, it would be necessary to keep a very large proportion of the catchment area under forest, and even such a measure would only afford protection to a limited extent.

Protection of the Soil.

Water rushing down a bare slope possesses a great mechanical power, by means of which it loosens the soil and carries it down hill. In this way, landslips are often caused, ravines are formed, and fertile land situated at the foot of the ravines may be covered with silt and rendered valueless. Frequently the *debris* collects in rivers and forms obstructions which are followed by a diversion of the bed and erosion of fertile lands. The rate at which this process proceeds, depends on the geological origin and the formation of the surface, the less binding the soil, and the looser the formation, the greater will be the damage. If on the other hand, a slope is covered with a well preserved forest, the roots of the trees, and the layers of humus keep together and protect the soil against the action of the water; besides, the crowns intercept and retain at any rate for a time, a considerable portion of water which reduces its velocity and force, or, at any rate, divide it into numerous small channels. The beneficial effect of tree vegetation in this respect can be observed in most mountain ranges, and especially in the Alps from France to Austria. Wherever in those parts extensive deforestations have taken

place, the consequence has been the gradual formation of a series of torrents in all places where the surface did not consist of hard rock; the *debris* brought down has covered more and more fertile land at the base of the torrents, and this evil has grown to such an extent, that not only in France, but also in the other Alpine countries, great efforts are now made to re-afforest the denuded areas at a great outlay. When once the evil has been created, immediate afforestation is not possible; it must be preceded by the construction of dams, dykes, walls, etc., to steady the soil until the young forest growth has had time to establish itself and once more to lay hold of the surface soil. The importance of maintaining a complete cover of vegetation in all such cases was recognised many years ago, so that already in the middle ages, so-called "Protection Forests" existed, which the then existing laws protected against devastation. Although the effect here described is perhaps most complete in the case of a well-stocked forest, similar effects can be produced by covering the soil in other ways, as, for instance, by a dense growth of heather, by turf, etc.

Forests protect the soil, not only in the hills, but also in the lowlands, wherever it consists of so-called moving sand, along the sea coast as well as in the interior of countries. The action in this case is due partly by keeping the soil together through their roots, by the formation of humus and the retention of moisture. In this way the Landes of France, have, from a dreary waste, been converted into extensive forests intersected by cultivated fields.

Protection against Avalanches.

Although most avalanches in the higher hills originate above the upper limit of tree growth, there are many cases where the presence of a well-preserved forest protects towns and villages lying below them, by preventing the formation of avalanches, or by stopping their forward movement and increase as long as they are yet small. Hence, many forests in the Alps are maintained as a protection against avalanches.

TREES IN CITIES.

Much has been done to beautify and render attractive our cities and towns by the planting of trees on the streets. But much better results would be obtainable if operations were conducted in a less hap-hazard fashion, if more attention were devoted to preserving the trees when planted from destruction, and in particular preventing them being sacrificed to the supposed needs of business or public convenience. It must have been a source of regret to every lover of nature in Toronto, to notice how needlessly and wantonly rows of large, healthy and well-developed shade trees have been cut down on one thoroughfare after another, because they interfered in some slight degree with the laying down of a granolithic sidewalk or a block pavement, or because stores took the place of houses in the neighborhood. In the great majority of these cases, the trees could have been saved by some slight deviation from the hard-and-fast rule of official uniformity and precision. But, no, the terms of the contract must be carried out to the letter, and the trees that have stood for a generation, a joy and beauty to the neighborhood, giving a glimpse of the freshness and bloom of nature amid the city's dust, and roar, and smoke are sacrificed to official stupidity!

Toronto has been, perhaps, exceptionally favored in the past as a city, where a few minutes walk from the business centre in almost any direction will bring you to streets well shaded with trees. But the process of modern "improvement" has been carried on with little regard to the preservation of this attraction, and in the more central parts of the city, the debatable land between the distinctively business and residence localities, the ravage has been great, and for the most part wholly unnecessary. There is no reason why, in widening sidewalks, or laying down new pavements, a clear space should not be left around any trees which stand in the way. A few breaks in the

rigid uniformity of the work would be of trifling importance in comparison to depriving the locality of the grateful shade and verdure of the trees. As to the practice of clearing away the shade trees whenever a street changes its character, and offices and stores take the place of private residences, it is equally stupid and unnecessary. There are, of course, businesses of such a nature that they require a clear frontage such as wholesale warehouses and the larger retail stores upon main streets. But so far as nine-tenths of the business places on the side streets are concerned, the clearance is a wanton, needless act of vandalism, undertaken in deference to a conventional notion that a street planted with trees does not look like a commercial locality. A pleasing exception to the prevalent idea is afforded by the upper portion of Scott street, in the heart of the business centre of Toronto, where contrary to the usual practice, a row of shade trees have been spared—a green oasis amid the surrounding wilderness of brick and mortar, and which affords a grateful rest to the eye, and a refreshing contrast to the lines of bare, unshaded streets around. It is to be regretted that the work of destruction has been allowed to proceed so far without any organized public protest against the official vandalism that is doing much to deprive Toronto of the charm of its well-shaded streets.

In addition to causeless destruction of trees at the caprice of city officials, there are other evils which threaten shade trees in crowded localities which demand more attention from those interested in civic matters than they have received. Prof. H. Marshall Ward, in a recently published article in the *New Review*, deals with the question of how to grow trees to the best advantage in the crowded cities of the Old World. Though his paper deals mainly with conditions which exist here only to a limited extent, it contains many suggestions which might be advantageously studied by Canadian municipal rulers. The writer comes to the conclusion that even in cities like London, Birmingham, Manchester and Liverpool where the atmosphere is polluted with gas and smoke, and darkened with soot and fog, much more might be done in the direction of increasing the number and variety of trees and flowers on the streets. He points out that there is a great difference in the susceptibility to injury from unfavorable atmospheric conditions in the different varieties. Coniferous trees are not nearly so well able to stand these conditions as the balsam poplar, black poplar, alder, sycamore, and some others, nor can the oak, beech, or birch long continue the struggle.

The chief point he wishes to make plain is that, at all events, in the smaller and more open English towns, many more varieties of trees will grow than have yet been tried, and that here, at any rate, "every effort ought to be made to plant some of the many beautiful North American and other foreign trees that can now be obtained, and are known to be capable of easy cultivation in such localities. Moreover, there can be no doubt that much is to be done in this direction in London and other large cities in spite of crowded dwellings and periodical fogs."

Professor Ward then points out some causes for the frequent failure of town trees which do not lie in the unsuitability of atmospheric conditions, and his words show that municipal authorities often work in England pretty much as they do in America. Town trees are "fixed, when young, in a hole, probably filled with good soil, and this is carefully covered in, the young trees suitably staked and protected, possibly the soil round the base of the stem covered with a grating, and the result is—failure! True, it often takes several years to accomplish this striking result, but its inevitableness is none the less assured. While the tree is young, and its root-system is revelling in the pocket of good soil, provided with the overhead grating which ensures a supply of rain-water and air, and it may be of manure also, all goes well, and the head of foliage above is able to make the most of what sunshine there is and to manufacture the substances which supply the wood, new buds, new roots, and, possibly, even flowers. But the time comes when the pocket of soil is exhausted by the roots and they put out spreading threadlike rootlets to explore the soil around. And now comes the critical period; these young rootlets are covered with myriads of extremely fine hairs, and these delicate root-hairs are the only organs which absorb the water containing small quantities of substances such as salts of potash, lime, nitrogen, phosphorus, etc., in solution, and they are utterly incapable of performing this work of absorption in the absence of oxygen. Now, what are

the usual conditions of affairs in the streets of a town? Even supposing these new spreading rootlets have good soil around them, and soil which is porous and deep, the rule is, that a practically hermetically sealed layer of flag-stones or asphalt lies above them, and their only chances of obtaining water and oxygen are through the grating and soil close to the stem. No doubt, the most is made of this, and the tree goes on for several years, doing better than if the flags or asphalt came up close to the stem. How often does it happen, however, that the new rootlets have nothing better to spread in than old brick rubbish or barren gravel; or, far worse, a soil which is saturated with the poison from leaking gas-pipes?"

Even sanitary appliances have an adverse effect upon town trees, for "the neighbouring sewers may be taking off, as fast as they can, the water from soil round the roots; or the case may be otherwise, and the stagnant water, standing too long at the roots of the tree, deprives them of the oxygen necessary for their life and lowers the temperature beyond a minimum they could temporarily withstand. What has been stated so far is enough to show that the wonder is not that trees so often fail in the streets of our cities and large towns, but that the interminable and dreary rows of planes, elms and limes that are planted ever come to anything at all." The author then notes the injuries which may come to town trees through the impact of vehicles, the gnawing of dogs and horses and the pranks of boys, and the danger of selecting, for street-planting, trees which send out long, straggling, superficial roots, running just under the pavement or road, because, as these roots thicken with increasing age, they lift up the flag-stones or other pavement, and, becoming a source of damage and danger to the street, are likely to be injured themselves by passing feet and wheels. The comparative brittleness of the limbs of different trees should also be considered before planting; and, after planting, proper methods of pruning or otherwise treating a tree which is in delicate health or has suffered external injury should be determined.

Although, says Professor Ward, for one reason or another, "the oak, ash, birch, beech and some others of our forest trees are unsuitable for town-planting, this is no sufficient reason for flooding London with planes, and planes only, as if no such trees as robinias, laburnums and American oaks, ashes, walnuts, maples, etc., existed. Moreover, there is every reason to predict success for trees as yet undreamt of as town ornaments. Let those in authority try some of the hardy magnolias—say *M. acuminata*, probably one of the best town trees—and extend their experiments to such as the robinia, the laburnum, the tulip-tree, the mulberry, fig, catalpa and the beautiful maiden-hair tree of Japan. The list might also include the almond, black walnut, and various species of sophora, kolreuteria, cercis, gymnocladus, acer, rhus, tilia, liquidambar, etc. Some judgment would have to be exercised in the matter, of course, but probably all of the trees here mentioned would succeed if properly planted . . . As regards poplars, ashes, alders, pavias, limes, gleditsia, horse-chestnuts, thorns, etc. . . . I will simply remark that these and many more can be placed in the list of trees and shrubs fit to be planted in large towns and cities; some, of course, are more fit for our cleaner and less smoky country towns, but many would resist the evil influences of a London atmosphere if properly planted and cared for."

According to the United States census returns, Chicago has a total length of 2,048 miles of streets of which 1,200 miles are lined with shade trees. Allowing 528 trees to the mile which would leave an average space of twenty feet between them, this would give a total of 644,600 trees, which at an estimate of $10 per tree, shows the sum of $6,446,000 invested in shade and ornamental trees. The trees planted out seldom cost less than $5 each, and some notable specimens have cost as high as $50.

An article published in the Chicago *News* gives the following interesting details regarding the planting of shade trees, and the varieties which have been found most desirable for the purpose.

These trees being set out by private individuals, on land invested in the city, are too often allowed to grow without pruning or attention, and oftentimes are not the thing of beauty that they might be if properly attended to. The recent idea of Ald. Vierling of planting and caring for shade trees by public officers would be excellent if one could only

hope that butchers would not be employed instead of foresters. There are many reasons why private effort cannot possibly arrive at the best results. One of these is that each owner acts solely on his own notions and the result is trees from 1 to 2 feet in diameter and 20 to 30 feet high in one place, while right next them are trees not over 10 feet high, then another size and so on.

Another serious difficulty is, one will plant an elm, another a maple, still another an ash. A few will still set out, because they cost next to nothing, a white willow, cottonwood or poplar. Now all these may be good in their way and place, but for purposes of street trees there is nothing gives so much satisfaction as the planting of one kind of tree on a street and reasonably near the same size of tree.

A street to be well treed should have them uniform in size, tall enough for the first set of branches not to interfere with the light from the street lamps and far enough apart to allow sun and wind full play on the streets.

Trees from the Woods.

Tree planting of early Chicago was almost exclusively confined to what are called soft-wooded trees, like the cottonwood and poplar, that will grow if stuck in the ground as mere poles. The Lombardy poplar was once very common and really the first tree planted of which there is any record, standing in serried rows like soldiers on parade. Some yellow ozier willows and the cottonwood was the sum total planted while Chicago was still but a swamp. An elm was then a rare tree and thought bad to transplant, which it was with the rude methods employed in the work at that time. When a little more care in planting was given, our noble American elm, became the tree, and but for its liability of attack from the red spider in dry times and fungus that browns the leaves it certainly is a grand street tree for a natural soil like that of this city.

Besides the elm, the ash, the linden, a few maples and an occasional birch are those planted from the woods. A good size to plant and one that can be brought into a better uniformity and more certain of success should have a bole a foot from the ground of from 6 to 8 inches in diameter.

Nursery-Grown Trees.

With the vast street-tree planting mania of this city there should be a dozen nurseries, each with a good supply of shade trees from 3 to 6 inches in diameter. But there is not, and probably the cause is to be found in the mania for large trees and impatience of waiting for smaller ones to grow. But the fashion in this respect is changing, and lots of people would now buy good nursery trees, if there were only enough of sizeable ones for the purpose. The advantage of nursery-grown trees is clean, uniform, straight boles, with tops in proportion that need no lopping off of branches at the time of planting. Such trees can be easily kept in subjection, so that if planted of one size and one kind of tree in lengths of streets sufficient for effect, there is no reason why the streets of Chicago should not be as attractive as the far-famed boulevards of Paris were under Baron Haussmann.

With the advent of nursery-grown trees we would get the advantage of a greater variety and among them the finest street shade trees in existence. It is scarcely worth while, however, to try these without giving them a better soil than blue clay or lake sand to grow in. As a good tree once planted will last a lifetime even of the oldest a little extra expense in soil should not be objected to.

Of the Maples.

Soft maple should never be planted as street trees. The miserable white cotton scale is bound to attack it every few years and while it may not kill outright, when so attacked it is a nuisance hardly bearable. Wier's cut-leaved maple is a more ornamental tree and seems to escape the scale. The hard maples, including the scarlet and sugar maple, are

splendid street trees, but to do well must have good, loamy soil. The English and Norway maples are the best of all, the leaves being larger—almost like a sycamore—and on high, gravelly ground are simply faultless as street trees. One good feature about the hard maples is that they do not grow out of shape and straggly—at least not until they get very old.

The Ash and the Linden.

Ash make fair street trees—shade not too dense, which is of great importance, and is one reason why large-leaved trees are better than very small-leaved ones. This is well illustrated by that noble tree, the buttonwood, which unfortunately, although making so good a street tree in St. Louis, for example, is of no use for us.

The American linden is of goodly size in the leaf, a compact grower and well adapted for a street tree. Plants raised in a nursery have stems as straight and clean as a whipstock. Its flowers also diffuse a delightful fragrance for a few days. It bears transplanting well, and is not so particular as to soil as some trees.

Birch and Elm.

Birch is hardly the thing for street trees, but for a single specimen on the lawn they are grand, particularly the cut-leaved variety. These belong to the small-leaved trees, and the shoots are a dense mass of twigs. It is a tree that bears trimming famously, so that it can always be kept within bounds. Good examples of trees kept pruned may be seen on Drexel boulevard.

For a majestic tree, standing out all alone where its branches have full sway, the American elm has no equal. As a street tree, planted as they are with us from the woods, they are rarely of a uniform growth. Some have nearly upright branches, others almost drooping. Still, take it all in all, save for the summer browning of the leaves, it makes a grand street tree. Of the European varieties there are not enough grown to have had a good trial as yet.

The Ash-Leaved Maple and Catalpa.

Negundo, or ash-leaved maple, is not infrequently planted, and sometimes can be seen in pretty outlines. But it is not a good street tree, its shade being far too dense. Besides, from some cause or other, its foliage often gets in bad shape toward the end of summer. They were very bad in South Park last summer.

From its very large leaves the catalpa is an attractive tree, but more suitable for a lawn than a street tree, although some few have been planted for the latter purpose. The only one that will stand our climate is the speciosa, which is a native of Illinois and Missouri. The southern species first planted here could not stand our climate.

The Horse Chestnut.

The horse chestnut, that does so well for a street tree in the east, is useless for the purpose here. While it may not die, its growth is so provokingly slow that it takes a lifetime to get it to twenty feet in height. The American buckeye, while of no use for a street tree, is an admirable inside low tree, lovely when in flower.

Other Kinds That Have Been Tried.

In wandering about the city one may come across other varieties that have been tried on a small scale, but they are hardly worth imitating. The white willow is one, but it is too littery a tree for the present day. Of the golden willow there are a few left, but it is a gnarly, crooked, useless tree. A few silver-leaved poplars may be seen, but they are fit only for the wilderness. The bird cherries have been tried, but they are too small and of no particular value. The alder is another that is of no use except for a wet spot.

PRACTICAL FORESTRY ON A SMALL SCALE.

It is perhaps unfortunate that the term forestry in its general acceptation has come to signify the preservation of a due proportion between wooded and cleared land over a large tract of country. Those who take any interest in the matter at all are apt to think of it as a science intended in its practical application to bring about far-reaching and general results on a grand scale in the modification of the climate and the conditions of the soil, and to lose sight of its bearing upon the concerns of the individual farmer or land-owner. They do not understand that the same principles of forest management, which brought to bear over an extensive region will result in safeguarding the interests of the future and securing the national prosperity, will if applied to the individual holding, prove of material advantage. Neither does the management of a farm in accordance with the principles of forestry necessarily involve a present outlay in the hope of a return on the investment in the more or less distant future. In fact in many cases it need not entail the labor and expense of replanting. Where there is still a portion of the farm under timber, the farmer can apply forestry principles to its management to his great pecuniary benefit simply by judicious selection in cutting and protecting the young trees from the inroads of cattle.

Forestry is simply the art of making the land devoted to wood-production yield as much as possible to the acre, and by intelligent care providing for the perpetual reproduction of the crop. Its practice demands no elaborate scientific study or technical knowledge other than that gained by observation from a common-sense point of view. The farmer who wishes to preserve his timber with an eye to the future, will readily understand the wastefulness of promiscuous chopping on land not intended to be thoroughly cleared and turned to account for agricultural purposes. It needs no book learning to teach him that the economical and prudent course is to thin out such spots as may be overcrowded, so that some of the trees have not space to attain their full development, and thus leave the remaining timber room to grow; or that in case the woods are already thinned out sufficiently the proper policy is to take a tree here and there, choosing the oldest or those of the least valuable varieties instead of narrowing the limits of the wood-lot by making a clearance in one place.

By a little thought and prudence in this matter the farmer can continue to draw his supplies of fuel from his corner of bushland without diminishing the source of future supply, and in a corresponding degree depreciating the value of his farm. But if in addition to this he sees fit to plant valuable varieties of timber the demand for which is certain to increase, even though he may obtain no direct money return, the value of the land will be augmented year by year with the growth of the young trees.

On many farms there are waste and barren patches wholly or partially cleared which not being good agricultural land are non-productive, excepting in so far as they are utilised as pasture-land. If these were planted, or even enclosed, and alllowed to grow up in second growth, they would in a comparatively few years prove a valuable source of revenue. What can be done to utilise such spots is shown by the following notable instance taken from the columns of *Garden and Forest*, a New York publication. After speaking of the numerous cases in which untillable land was allowed to lie waste, and pointing out that by permitting timber to grow up such areas might be a source of profit to the owner, the writer, Mr. H. B. Ayres, goes on to say :

One such lot, which seems characteristic, was found in Warren County, New Jersey, in the Pequest Valley and is a fair example of what may be expected on muck land that produces only sedge-grass and wild rose-bushes when cleared and pastured. Some of the notes of most general interest are here given. The soil is muck, from one to four feet deep. The subsoil is drift redeposited by a post-glacial lake near its eastern shore, and consists of sand and clay irregularly bedded, with some "hard pan." A spring brook flows through the tract. The surface of the water in the brook is above the surface of most of the subsoil, and supplies the soil with abundant and constant moisture, except during unusual drouth.

Prior to 1858 this lot of seven acres has been continuously depleted of tree-growth and burned over. At this date a few defective trees, say twenty, were standing, with about half of the tract in coppice of maple and ash, the remainder being occupied by sedge-grass, rose-bushes and scattering seedlings. The whole young growth was then cut off, and during the next ten years it was burned over every spring to reduce it to pasture. In spite of the fire and pasturing, the young growth gradually developed into a complete cover. The maples, starting freely among the sedge-grass, were at first eaten off by the cattle, but dense clumps and belts of rose-bushes annoyed the cattle, and, finally, with blackberry vines, formed so dense a hedge near the adjacent cultivated land that the cattle seldom penetrated into the young growth of trees.

The last places to be covered were two very wet spots (where the seedlings at last started on decayed logs, sending their roots down a foot or two to the soil, as the logs rotted away), and the higher ground that was never overflowed. The latter was most grazed by the cattle, and was only covered by seedlings after the cattle were hedged out. The trees are thus not all of one age ; some are from the seed, others are sprouts from the small stumps left from browsing. The trees near the "fail places," or those places last covered, started up very limby, and are now very much shorter than those densely grown from the first. The species found on this lot were red maple, black ash, swamp white oak, pin oak, sycamore, white birch and white elm. The red maple is throughout the most numerous, and in the parts most subject to overflow is only accompanied by a few ash and elm. The oldest of the trees are now about thirty years, and the youngest fifteen years. The greatest space between trees is twenty-five feet and the average is about seven feet.

The growth on the whole tract is vigorous, and the crown cover is very nearly complete. The trunks of the best trees are free from live limbs to a height of thirty feet above the ground, and are now nearly smooth, though a few dead branches are still adhering near the lowest live limbs. Many inferior trees are dead and sickly from overcrowding, but the remainder will be the better for their death. All the leading trees are vigorous. It is noticed that the white birch and swamp white oak are rapidly overtopped and killed by the red maple. The elm holds its own with difficulty, while the ash, in damp spots, where there is more space, seems to equal the maple, and will eventually overtop it.

An area was selected that seemed to represent fairly the average of the whole tract. The measurements on this acre showed the average to be as follows : Number of trees per acre, 901 ; height, 48 feet ; diameter, 6 inches on stump, and 5 inches breast-high ; contents, 4.1 cubic feet per tree, or 3,685 cubic feet per acre ; merchantable wood, 3.4 cubic feet per tree, or 30.6 cords per acre.

TABLE OF GROWTH.

No. of section.	Dist. from ground.	No. of rings.	Diameter.
	feet. inches.		inches.
No. 1	8	24	6
No. 2	4 8	22	$4\frac{15}{16}$
No. 3	8 8	20	$4\frac{5}{16}$
No. 4	12 8	19	$4\frac{3}{16}$
No. 5	16 8	16	4
No. 6	20 8	15	$3\frac{5}{8}$
No. 7	24 8	13	$3\frac{1}{4}$
No. 8	28 8	11	3
No. 9	32 8	9	$2\frac{5}{8}$
No. 10	36 8	8	$1\frac{15}{16}$
No. 11	40 8	5	$1\frac{1}{4}$
No. 12	44 8	3	$\frac{5}{8}$
No. 13	48 8	1	$\frac{1}{8}$

The value of this land at the time attempts at clearing were abandoned in the year 1868 was not more than ten dollars per acre. To-day the market value of the wood-growth alone is $30 per acre.

The reader will observe that in this case all that was done was to leave nature to do the work of re-forestation unmolested. If in addition the owner had chosen to re-plant, choosing the best, most profitable or quickest-growing kinds of trees, the value of the timber would have been far greater.

There is a suggestion for Canadian farmers as to a profitable source of revenue in the following. Post material is continually growing scarcer in Ontario, and before such a crop could arrive at maturity the price is certain to be considerably higher than at present.

Mr. Waldo F. Brown writes to the *Country Gentleman* that the black locust can be profitably planted for posts, at least in Ohio. He asserts that farms have been sold there at from $20 to $30 an acre, which, if planted in locust-timber, would yield several hundred dollars an acre in posts within twenty years, and then would make a second harvest quicker than the first grew. He cites an instance of a ten-acre grove which was cut off between 1860 and 1870 and then sold for posts. How much this first cutting brought could not be ascertained, but it was certainly profitable. In just eleven years after the present owner began to sell posts from the second growth, and he has since had a regular income every year. Between 1879 and 1883 he cut 6,608 posts from the ten acres which brought $991, or an average of fifteen cents a post, and ever since then he has cut and sold large quantities. For ten years past this land, which is a steep hill-side unfit for cultivation, has yielded more profit than the remaining ninety level acres of the same farm which have been under cultivation. In another case a row of thirty-three locust trees, which had been planted along the north line of a farm for twenty rods, was cut after having grown twenty-five years. The harvest was 400 good posts, worth twenty-five cents, 600 fence-stakes, worth five cents each, and enough wood to pay for cutting and splitting the posts. From the second growth of this grove the owner has cut all the posts needed to keep the fences on his farm of 150 acres, and he has now 200 posts seasoned for future use. These trees occupy only a quarter of an acre of land. How long one planting of locust-timber will continue to yield crops no one knows. As soon as a grove is cut off it begins to send up a new crop, which grows rapidly, and will be large enough for post timber some years sooner than such timber could be grown from seed. Mr. Brown once examined a grove of two acres on which the trees had been cut eleven years before, and found that each stump had thrown up from three to seven sprouts, the largest of which were then being cut. This thinning process went on for several years, until all but one of these sprouts to each stump was cut, and then enough trees were left to make a dense forest. In the thirteenth year after the original cutting 400 posts were cut from two acres.

It is in the line of urging individual effort and acquainting the masses of the people, more especially the farmers, with the rudimentary, common-sense principles of managing timber-producing land or land that should be devoted to that purpose, that forestry will for some time to come find its principal sphere of utility. On this phase of the subject we cannot do better than quote the following from an able paper read by Mr. Gifford Pinchot at the latest meeting of the American Forestry Association :

"The spirit of the recent Swiss forest-legislation is one which must permeate our own coming forest-laws if they are to win that acceptance with the people without which they must be worse than useless. It has been summarised as follows by Professor Landolt : 'Our forest-laws are intended to work more through instruction, good example and encouragement than by severe regulations. This method is somewhat slower than one which should involve more drastic measures, but the results achieved are more useful and lasting. When forest-proprietors do something because they are convinced of its utility, it is done well and with an eye to the future ; but what they do under compulsion is done carelessly and neglected at the first opportunity. What they have come to learn in this way, and have recognised as good, will be carried out, and that better and better from year to year.' This homely statement of the great Swiss forester is full of the wise moderation of a man conscious of the dignity of his work. Successful forest-reform, here as there, must be a growth from the education of the people, finding its expression in laws which respect both the needs of the forest and the needs of the people, and which waste no

time in mistakes. Such legislation is respected, because it is capable of being enforced. The results of it are so large, it is so surely a part of the future, that the friends of forestry in America ought to work for it with the steady vigor of men who know they are going to win."

THE TREES OF BRITISH COLUMBIA.

Mr. Julian Ralph, an able American writer, in a paper descriptive of the great natural resources of the Province of British Columbia, gives an interesting survey of the forest products of our Pacific domain, and the growing timber industry of that region. From the following extract it will be seen that the forests of British Columbia differ very greatly from those of Eastern Canada in their characteristics. It is to be hoped that these vast sources of national wealth and prosperity just being opened will not be wasted as recklessly and improvidently as has been the case in other portions of this continent. The British Columbians should learn from the experience of older-settled communities which are now undergoing the disastrous consequences of indiscriminate forest destruction, and not wait until the greater part of the mischief has been done before taking measures to preserve the sorry remnant of their forest wealth.

"I enjoyed the good fortune to talk at length with a civil engineer of high repute who has explored the greater part of southern British Columbia—at least in so far as its main valleys, waterways, trails, and mountain passes are concerned. Having learned not to place too high a value upon the printed matter put forth in praise of any new country, I was especially pleased to obtain this man's practical impressions concerning the store and quality and kinds of timber the province contains. He said, not to use his own words, that timber is found all the way back from the coast to the Rockies, but it is in its most plentiful and majestic forms on the west slope of these mountains and on the west slope of the Coast Range. The very largest trees are between the Coast Range and the coast. The country between the Rocky Mountains and the Coast Range is dry by comparison with the parts where the timber thrives best, and naturally the forests are inferior. Between the Rockies and the Kootenay River cedar tamaracks reach six and eight feet in diameter, and attain a height of 200 feet not infrequently. There are two or three kinds of fir and some pines (though not very many) in this region. There is very little leaf-wood, and no hardwood. Maples are found, to be sure, but they are rather more like bushes than trees to the British Columbian mind. As one moves westward the same timber prevails, but it grows shorter and smaller until the low coast country is reached. There, as has been said, the giant forests occur again. This coast region is largely a flat country, but there are not many miles of it.

"To this rule, as here laid down, there are some notable exceptions. One particular tree, called there the bull-pine—it is the pine of Lake Superior and the East—grows to great size all over the province. It is a common thing to find the trunks of these trees measuring four feet in diameter, or nearly thirteen feet in circumference. It is not especially valuable for timber because it is too sappy. It is short-lived when exposed to the weather, and is therefore not in demand for railroad work; but for the ordinary uses to which builders put timber it answers very well.

"There is a maple which attains great size at the coast, and which, when dressed, closely resembles bird's-eye maple. It is called locally the vine-maple. The trees are found with a diameter of two and a half to three feet, but the trunks seldom rise above forty or fifty fees. The wood is crooked. It runs very badly. This, of course, is what gives it the beautiful grain it possesses, and which must sooner or later find a ready market for it. There is plenty of hemlock in the province, but it is nothing like so large as that which is found in the East, and its bark is not so thick. Its size renders it serviceable for nothing larger than railway ties, and the trees grow in such inaccessible places, half-way up the mountains, that it is for the most part unprofitable to handle it.

The red cedars—the wood of which is consumed in the manufacture of pencils and cigar-boxes—are also small. On the other hand, the white cedar reaches enormous sizes, up to fifteen feet in thickness at the base, very often. It is not at all extraordinary to find these cedars reaching 200 feet above the ground, and one was cut at Port Moody, in clearing the way for the railroad, that had a length of 310 feet. When fires rage in the provincial forests, the wood of these trees is what is consumed, and usually the trunks, hollow and empty, stand grimly in their places after the fire would otherwise have been forgotten. These great tubes are often of such dimensions that men put windows and doors in them and use them for dwellings. In the valleys are immense numbers of poplars of the common and cottonwood species, white birch, alder, willow, and yew trees, but they are not estimated in the forest wealth of the province, because of the expense that marketing them would entail.

"This fact concerning the small timber indicates at once the primitive character of the country, and the vast wealth it possesses in what might be called heroic timber, that is, sufficiently valuable to force its way to market even from out that unopened wilderness. It was the opinion of the engineer to whom I have referred that timber land which does not attract the second glance of a prospector in British Columbia, would be considered of the first importance in Maine and New Brunswick. To put it in another way, riverside timber land which in those countries would fetch fifty dollars the acre solely for its wood, in British Columbia would not be taken up. In time it may be cut, undoubtedly it must be, when new railroads alter its value, and therefore it is impossible even roughly to estimate the value of the provincial forests.

"A great business is carried on in the shipment of ninety-foot and one-hundred-foot Douglas fir sticks to the great car-building works of the United States and Canada. They are used in the massive bottom frames of palace cars. The only limit that has yet been reached in this industry is not in the size of the logs, but in the capacities of the saw-mills, and in the possibilities of transportation by rail, for these logs require three cars to support their length. Except for the valleys, the whole vast country is enormously rich in this timber, the mountains (excepting the Rockies) being clothed with it from their bases to their tops. Vancouver Island is a heavily and valuably timbered country. It bears the same trees as the mainland, except that it has the oak-trees and does not possess the tamarac. The Vancouver Island oaks do not exceed two or two and a half feet in diameter. The Douglas fir grows to tremendous proportions, especially on the north end of the Island. In the old offices of the Canadian Pacific Railway at Vancouver are panels of this wood that are thirteen feet across, showing that they came from a tree who trunk was forty feet in circumference. Tens of thousands of these firs are from eight to ten feet in diameter at the bottom.

"Other trees of the province are the great silver-fir, the wood of which is not very valuable; Engleman's spruce, which is very like white spruce, and is very abundant; balsam-spruce, often exceeding two feet in diameter; the yellow or pitch pine; white pine; yellow cypress; crab-apple, occurring as a small tree or shrub; Western birch, common in the Columbia region; paper or canoe birch, found sparingly on Vancouver Island and on the lower Fraser, but in abundance and of large size in the Peace River and upper Fraser regions; dogwood; arbutus; and several minor trees."

THE FOREST OF FONTAINEBLEAU.

An interesting description of the famous French forest of Fontainebleau, notable for its historic no less than its artistic associations, lately appeared in the St. Louis *Globe-Democrat*, the following extracts from which convey a clear idea of the difference between the carefully managed forests of the old world and those of America, where the natural growth has been uninterfered with.

The popularity won by the paintings of Millet, Rousseau and others of the Barbizon school has called public attention to the famous forest of Fontainebleau and the wealth of artistic material it is supposed to possess. Artistic writers as a rule do nothing by halves, and it is therefore not surprising that enthusiastic devotees of the new school of nature, as represented by the two great painters whose names have been already mentioned, should be thrown into spasms of admiration at the bare mention of Barbizon and Fontainebleau. It is the centre of the new "return to nature," and therefore represents to the worshippers of nature what the lakes of England typify to admirers of the Lake School of poetry.

To him who has contemplated forests such as are found in America the forest of Fontainebleau is a great disappointment. In the first place, it is not, in the strict sense of the word, a forest at all, but a carefully preserved and, in many places, an exceedingly artificial park. Its extent is considerable, being about sixty-five square miles, but aside from a few hills here and there of no great elevation, its surface is comparatively level. In some places, occasional masses of stone crop out, the size of the blocks being from 20 to 50 feet in height, and the irregularity of the masses giving a certain picturesqueness to the locality, which without their presence would be lacking. Large oaks are found in abundance, some of them being, it is believed, from four to five centuries old. There are also other forest trees, of species common to France, but the forests have been preserved with an eye to effect; the landscape gardeners are constantly passing to and fro, ascertaining where they may make changes for the better, planting here, felling there, with a constant eye to effect.

The landscape gardener and woodsmen are, therefore, largely responsible for the appearance of the forest. It is a forest in the sense that there is an abundance of trees, but the wildness, the naturalness of a genuine forest are utterly lacking. Hundreds of little paths wind to and fro through Fontainebleau. Thousands of sign-posts are set up, bearing directions to the pedestrians, and few indeed are the ways he can tread without meeting frequent signs of civilization. There is no undergrowth, except in spots where it has been carefully planted. There are no dead branches cumbering the ground; all these are daily removed. There is no evidence of the neglect, the desolation which prevail in a natural forest. Many of the trees show careful signs of pruning, and everywhere the observer is impressed with the artificiality of the landscape before him.

When compared with the Yosemite Valley, with the Yellowstone Park, with the grand forests of the Upper Missouri, with the cañons and gorges of Colorado, with the wild prospects of Montana and Dakota, or even with the swamp scenes of Louisiana and Florida, the forest of Fontainebleau dwindles into insignificance. The works of art will not bear comparison with those of nature, and even the neglect and prodigality of nature are more admirable than the most scrupulous care which evinces the presence of artistic design.

Less than fifty years ago the Fontainebleau Park became suddenly fashionable as a resort for artists. It was a place where they might admire nature in an enthusiastic kind of way, without taking too much trouble. They loved nature, no doubt, but not so enthusiastically as to be willing to take much pains or go to much expense in order to gratify their longing for the wildness of natural scenery. Nature is seen in savage abundance in Norway, but the mountains and fjords of the Scandinavian coast are distant many days' journey from the nearest seaport of France. Switzerland has scenery, but climbing is troublesome work, living at Swiss chalets and hotels is expensive, and even the nearest part of Switzerland is hundreds of miles from Paris. The Spanish Pyrenees, where nature may be seen in her wildest glory, are not readily accessible, while the Black Forest, a forest in reality, is in Germany, and for a long time it has been contrary to French principles to admire anything German.

The forest of Fontainebleau had every advantage. It was entirely French; being only thirty-five miles from Paris it was easily accessible. An artist could spend a day there and return to his quarter in the Quartier Latin easily and quickly. It was, beyond all things, natural enough to suit the aspirations of painters who preferred nature with a few embellishments added to her countenance. So Fontainebleau became the fashion. A few leading painters made it such, and in France, especially, to be out of fashion is to be out of the world.

THE RELATION OF FORESTS TO CIVILISATION.

The following paper from the pen of Hon. Warren Higley, a former President of the American Forestry Congress, on "The Relations of Forests to Civilzation," brings out very clearly the economic aspects of the question, more especially in relation to the effect of forests upon the water supply. With the rise of great cities the securing of an adequate supply of water to satisfy the continually increasing needs of the centres of population has become one of the most urgent problems of the time. Sources of supply once thought to be copious have in dry seasons been found to be insufficient on account of the greatly diminished yield of the streams and springs, owing to deforestation on the one hand and the considerably augmented necessities of the population on the other. As Mr. Warren's paper shows, the effect of the destruction of the forests about the head-waters of the streams which supply New York and Philadelphia with water, has been to seriously threaten the people of those cities with a water famine. Their experience should be a warning to Canadians of the evils at present generally unforeseen which may result from the reckless and wholesale destruction of our forests.

Whatever contributes to the necessities of man, and through him to the strength and greatness of the nation, becomes an important factor in civilisation. We study with profound interest the progress of the intellectual development of the race from the remotest dawn of history to the present time.

The epics of Homer, the philosophy of Plato, whose writings Emerson says "embody the wisdom of the world," Virgil, Dante, Shakespeare and Goethe, give expression to the highest intellectual developments of their times. Scientists, discoverers and inventors have enabled man to utilise the forces of nature toward the progress and civilization of this nineteenth century. But without the necessary physical conditions and environments a nation cannot maintain her superiority, however eminent may be be her men of letters and science.

The foundation of continued and lasting national prosperity lies in the physical condition of the country, with reference to its healthfulness and productiveness. A prosperous nation cannot be built up in a desert, nor can a people continue in power and influence when the territory from which they draw their sustenance shall have receded into barrenness, and while this is undoubtedly true of nations as a whole, it is proportionately true of any portion of the nation's domain.

Through the beneficence of forests and vegetable growth the earth was prepared for the habitation of man; and the carbon imprisoned in vegetable fibre from the ambient air was stored in exhaustless beds for the use of teeming millions when the forest supply should become inadequate to their wants. A requisite proportion of forest area is necessary to the continued prosperity and highest development of a people.

Effect Upon the Water Supply.

The water supply of our large cities is one of the very difficult problems with which our growing municipalities have to wrestle.

The accessible rivers and springs and lakes that a few years ago were thought to be sufficient for a century have already, in many instances, so diminished during the dry season as to seriously threaten a water famine, with all the horrors which such a catastrophe would entail.

The Schuylkill.

For several years past the engineers of the water works department of Philadelphia have been making examinations of all possible sources of a suitable and adequate supply of water, and they have recently discovered how seriously the Schuylkill river, from which the city has ever drawn its supply, has been affected by the clearing of the forests from

the territory of its head waters and supplying streams. Sixty-five years ago the summer flow of the Schuylkill was estimated at 500,000,000 gallons per day. Measurements made from time to time showed a gradual diminution, until in 1874 the minimum summer flow was only 250,000,000 gallons per day, and this has greatly diminished since. This fact is well authenticated, and it is clearly evident that these changes have been effected by the gradual deforesting of the country from which the head waters and supplying streams were fed.

The forests act as a sponge, absorbing and holding the waters in the loose vegetable mold or duff and shallow swamps, to be given slowly out in the dry season. They hold the snows of winter until late in the spring, and thereby tend to check destructive floods; and with their leafy covering they prevent the rapid evaporation which dries the open fields under the summer suns.

The Croton.

Only a few weeks ago New York was threatened with a water famine, notwithstanding the great tunnel that taps Croton lake forty miles away and absorbs the available streams and springs in the whole Croton water shed. This section of the country had experienced a long continued drouth. The largely deforested region from which the river draws its supply was unable to hold back the floods of spring and the rains of summer to any considerable extent, and what remained the evaporation of the open country largely exhausted.

Were a large and adequate proportion of this water-shed densely forested, a constant water supply for the city of New York would be assured even through seasons of long continued drouth.

Where will New York's water supply come from in the year 1900, when her population will aggregate 5,000,000 souls within a radius of thirty miles from the City Hall? In less than fifty years at her present rate of growth New York city with Brooklyn and the same territory will support a population of 10,000,000. Then she will have to tap Lake Champlain.

Central New York.

Let me give you an example of the effects of cutting of the forests in a rural district in Central New York, drawn from my own observation and experience. In Cayuga county streams that forty years ago kept the ponds well filled for the saw-mill and grist-mill, and furnished a never failing supply of water for the farm, are now dry in summer, with the exception of here and there a stagnant pool; the dam is decayed and washed away, the mills gone, and the once picturesque scene is changed to that of desolation. Yet with the warm rains of spring and melting snows the streams overflow their banks, and the swift waters carry away fences, bridges and embankments. Spring opens later. The young cattle were wont to be turned into the wood-sheltered pasture about the 1st of April, now they are kept shut up until the middle of May. Peach orchards that were sure to be loaded every year with luscious fruit have almost disappeared, and the crop is the exception rather than the rule. The extremes of heat and cold are greater, and drouths in summer and floods in springtime are more frequent and more destructive. Trace the stream to its source, and the cause of these things is apparent. The old tamarack swamp that used to supply the boys and girls with aromatic gum, and in which the creek had its beginning, has all been cut away. The thickly wooded black ash swamps through which the stream ran in its course to the lake, have been cleared, and their marshy, areas have given place to cultivated fields and pastures.

The cutting away the forests from the head waters and the banks of these streams accounts largely for the changes I have noted, and this picture, I doubt not, is a very familiar one in central and western New York. It is not difficult for those who know the effects of stripping the forests from small areas around the head waters of the smaller steams to understand why summer navigation in the Mississippi, the Missouri, and the

Ohio has become difficult and at times impossible, where it was easy and constant a few years ago; or why the Hudson, the Mohawk, and the Genesee are so much lower in summer and higher in spring than in former years. The partial deforesting of the Adirondack region has sufficiently demonstrated the fact that were this great water-shed stripped of its forest covering, the Empire state would lose her prestige, and New York city her rank as the first commercial city of the new world.

Economics.

The study of political economy is demanding very general attention. An increasing interest is manifested in all the economic questions immediately affecting the ruling industries. Supply and demand, governing price and wages and the character of citizenship are the balance wheel of trade, and demand the most careful scrutiny of the business world to so adjust them as to prevent oppression and insure the general good. Labor organisations on the one hand and trusts organisations on the other, are zealously contending for larger and surer incomes. Capital and labor fail to harmonise, and many a battle will have to be fought before the rights of each and the mutual interdependence shall be recognised and respected. The adjustment of apparently adverse interests between capital and labor is necessary to public prosperity—and must come through the better understanding of economic questions.

But what we should war against is the useless destruction and waste of our forest wealth that has so generally prevailed. Forest fires that should have been prevented have annually destroyed millions of acres of valuable timber in New Jersey, Pennsylvania, Michigan, New York, in all parts of the Union, and in many of the mountainous regions the very soil that covered the rocks has been burned away, and centuries must elapse before the sheltering forests can again clothe them.

In the census year of 1880 Professor Sargent estimates that 10,274,089 acres of our forest area were burned, involving a loss of $25,462,250. He says in his published report that fire and browsing animals inflict greater permanent injury upon the forests of the country than the axe, recklessly and wastefully as it is generally used against them.

What our best civilisation demands, in my opinion, is the establishment of a wise and efficient forestry administration in every state of the Union, whereby the great water sheds of our important rivers and streams, and all mountainous and broken areas unfitted for agriculture, or that may be necessary to the public welfare for climatic and hydrographic reasons, shall be forever devoted to forest culture, and to supplying the growing demand for wood and timber in our varies industries.

It is a mistaken notion that prevails, that lumbering necessarily destroys the forests, although so far it generally has. On the contrary, lumbering conducted according to the principles of forestry, as in Germany and France, protects and improves them. The large and ripened timber is removed for market, and the smaller growth is thereby enabled to develop because of better light conditions and suitable care.

Forestry, like agriculture and mining, is a business, and when better understood will command equal attention, and be recognised as a factor that enters largely into the more immediate economic questions of the day.

Monetary Value of Our Forest Products.

The annual product of our forests constitutes one of the most important factors in the nation's wealth. Viewed simply from its monetary value, it ranks third in the great industries of the country, manufactories of all kinds being first and agriculture second. Dr. E. J. James, of the University of Pennsylvania, a distinguished political economist, gives a vivid picture of this portion of our nation's wealth, in a comparison of values of forest products with those of other industries, based upon the census reports of 1880. He says:

"The value of the forest products in that year (1879) was equal to one-third of that of all products whatsoever sold, consumed or on hand. It exceeded by nearly one hundred

million dollars the total assessed value of all the farming property in the New England states, and by a somewhat smaller figure that of the farms of Virginia, North and South Carolina, Alabama and Mississippi.

"If to the value of the total output of all our veins of gold, silver, coal, iron, copper, lead and zinc, were added the value of the product of stone quarries and petroleum wells, and this sum were increased by the estimated value of all the steamboats, sailing vessels, canal boats, flat boats and barges plying in American waters and belonging to citizens of the United States, it would still be less than the value of the forest crop by a sum sufficient to purchase at cost of construction all the canals, buy up at par all the stock of the telegraph companies, pay their bonded debts and construct and equip all the telephone lines in the United States.

"This sum of $700,000,000, the value of the forest product of the United States for the year 1879, exceeds the gross income of all the railroads and transportation companies in the United States, and if we leave out New York and Pennsylvania it would suffice to pay the public indebtedness of all other states in the Union, including that of all the counties, townships, school districts and cities within those states."

Since 1879 there has been a large increase in the consumption of our forest products, and at a very conservative estimate their monetary value has grown to exceed $800,000,000 year per.

That so vast an interest has an important bearing upon our prosperity and development as a nation no one will deny. But great as this interest is as an economic factor in our civilisation it is small in comparison with the influence of growing forests upon climate and water supply, upon agriculture, commerce and manufactories and health conditions for the people.

Time will not permit me, in this brief paper, to multiply examples illustrative of this assertion. But the fact is conceded by scientists who have most carefully investigated the subject, and confirmed by history, as we have seen, that a country whose hills and mountain sides are stripped of their forest covering becomes thereby incapable of sustaining a prosperous and civilized people.

Must we then cease to cut the timber and market the forest product in order to preserve the conditions necessary for successful agriculture and water supply and river commerce? This we cannot do. Wood and timber are greater necessities than coal and iron; and while the fact remains that the present consumption of the forest product is double the increment of its growth in this country, and that the original growth of some of our most valuable woods, like the white pine and the black walnut and cherry, is nearly exhausted, we have large reserves of other woods to take their places on the markets. We need have no fears of a lumber famine, with the facilities of commerce now encircling this globe.

What we want especially is a more enlightened public opinion on this subject. It takes a hundred years to grow a magnificent forest. Let us be patriotic and foresighted, and plant and legislate for the future.

We cannot live and prosper as a nation without a due proportion of forests, rightly distributed. They constitute our great sanitariums. The pine forests of the south, the wood-covered mountains of North Carolina, the Adirondacks, invite the invalid to recuperation and health.

The forests protect and regulate the water supply, add beauty to the landscape, and break the force of the cyclone.

The forests restore waste places to fertility and productiveness, and contribute of their bounty to the mechanical arts and industries millions of wealth annually.

I have thus endeavored to establish what I believe to be true, that in their various aspects the forests constitute the greatest factor in our civilisation.

WILLOWS AS SHADE TREES.

The willows are among the most useful trees we have for farm ornamentation; especially good for busy people like the working farmer and his family, who want beauty but can devote only a small portion of the time in the busy season to tree planting. All varieties of willows will grow from fresh cuttings driven in the ground in a moist place, These cuttings may be of any size, from the small switches to straight branches as large as can be handled. Those about the size of bean poles seem to flourish best. Small ones grow well enough, but are more liable to injury. They are not particular about soil. provided they have plenty of water, but of course will grow faster in rich earth. In a wet season they will grow from cuttings stuck down anywhere; but if wanted for a place that becomes very dry in summer they had better be rooted first. One of the finest avenues of trees the writer ever saw was of willows, grown from cuttings, planted in holes made with a crowbar. The season was favorable, and in a long avenue planted in this way only two failed to live. The owner cut the poles from a neighbor's trees and set them out at a total cost of only half a day's work. They are now lofty trees meeting over the road, and people turn out of their usual course for the pleasure of driving under them. It was the best half day's work that man ever performed. Avenues as a rule look best when all of one species, but a favorite way of planting is to alternate the weeping willow (*Salix Babylonica*) with the golden-branched willow (*S. vitellina*), the growth and colors contrasting well. "A willow walk," made by planting osier willows (*S. viminalis*) thickly on both sides of a straight, level path is always admired and can be made profitable, too, if there are any basket-makers about. If it is laid out so as to show a view of water at the end it may be made especially attractive.

Willows are among the first trees to put forth their leaves in spring, and the last to shed them in autumn. They harbor few insects, and grow rapidly. The wood is too soft to be particularly valuable as timber, but does for light fires, for charcoal, and many other purposes. The trees are bright and cheerful when young, and assume rugged and picturesque forms as they grow old. The limbs are sometimes broken by high winds, but they recover rapidly from injury and submit to the severest trimming without serious impairment. There is nothing unhealthful in the proximity of the trees although they, or any other trees, should not be planted where their shade will fall directly on dwellings. Where small trees are wanted there are some dwarf or shrublike species of great beauty to use. There are perhaps thirty kinds, altogether, adapted to ornamental planting of home grounds as well as public parks. With suitable ground a single specimen, especially of some of the weeping or drooping varieties, will make a showy and graceful ornament. Two or three or more, planted in a clump, give a pleasing effect.—*John De Wolf, New York.*

CALIFORNIA TREES.

The subjoined article from the Providence (Rhode Island) *Journal* comprises some valuable information with regard to the trees of California. The "giant trees" have been often described, but as will be seen there are many other varieties of forest growth peculiar to that locality which are almost equally remarkable. It is a matter for regret that many of these unique and beautiful species are threatened with extinction owing to the policy of reckless clearance and the greed which leads to the destruction of valuable timber for a slight immediate profit without consideration for the needs of the future. The manner in which these grand forests are being ruined by promiscuous cutting is the strongest possible argument for strict measures of forest preservation. Unfortunately the wasteful process of cutting down valuable trees merely for their bark and leaving the trunks to rot on the ground, or furnish the fuel for forest fires, is by no means confined to California. It is too often practised in our own back townships. Stringent legislation is needed to repress such vandalism.

To the forest rambler California opens a new field of interest. Its forest flora is quite distinct from that of the rest of the world; and the general appearance of the Californian woods is altogether different from that of any forest elsewhere. One of the points attracting curious consideration in our forest is the number of trees restricted in their native habitat to a few acres of ground and found naturally nowhere else on the globe. Who has not heard of the giant Sequoia? Who has not heard of its girth and its grandeur, of its wonderful bark like the velvet of Lyons, and the towering stretch of its arms to the azure? These big trees, together with a number of other species, now only found in California, were once widely distributed. Fossil remains of some of them have been found even in the frozen soil of Greenland. Their extinction in other parts of the world seems sadly enough to be their destiny in California. The condition which is preventing, in all probability, their reproduction, is a progressive diminution of humidity in the air. One rarely sees a wild seedling Sequoia of either variety, a seedling Sugar Pine (*Pinus lambertiana*) or Monterey Cypress (*Cupressus macrocarpa*). This is also true of the Torrey pine, the Wild Cherry of Catalina, and of many of our trees and shrubs; while on the other hand there is a strong reproductive power in others of the California trees such as the Douglas spruce, Monterey pine, several of the oaks, etc.

Several groves of the Sequoia Gigantea or Big Trees are found in California This great tree is now native to only California, and in this State is confined to one range of mountains, the Sierra Nevada. The largest grove is a true forest, and lies back of Fresno in the Southern Sierra.

The largest tree in the world has only recently been found. It is a Sequoia Gigantea and measures 160 feet in circumference at the highest point a man can reach from the ground This tree stands in a small valley surrounded by precipices at the headwaters of the Kaweah river.

Perhaps the tree that combines best beauty and grandeur is the brother of the giant Sequoia, the lovely and impressive Redwood. The Sequoia sempervirens is confined also to one range of mountains, the Coast Range near the Pacific Ocean. While vast forests of it exist and to-day form the lumber resource of California, the Redwood is not reproducing itself, but is being replaced as it is cut and burned away by other and less notable trees. It has one very exceptional trait for a conifer which is doing much to retard its disappearance. The Redwood sprouts from the cut stump and makes a numerous progeny to replace the grandeur of the parent used by the lumber pool. The vitality of the Redwood stump is paralleled by the Redwood log. I have heard of several striking instances of these logs sprouting long after having been cut, and have seen one instance myself. It was a very large log, weather-stained and lying on two or three others in a narrow valley of the Santa Cruz Mountains. From this log were two bright little branches of Redwood foliage, one about two feet long and the other six inches. The log had been cut three years. This quality would indicate a facility for coming from the cutting which would be useful in replanting the desolated lumber districts.

The Coast Range forests are full of interesting trees. One of these is the Madrona-Arbutus Mensiesii. Its leaf is glossy, reminding one of the magnolia, and its bark a dark red except when at certain seasons the old bark is shed; it is then white. The Madrona bears red berries, and in the damp cañons of the Coast Range, where it is at its best, is certainly a beautiful addition to the more sombre Redwoods

The long-coned spruce of the Sierra Madre strays down the hot southern slopes of this steep range and even joins hands in the cañons with the more adventurous sycamores coming up from the valleys. This spruce may play an important part in retimbering some of our uncultivatable foot-hills, It is a beautiful tree when mature and equally attractive when young. In Southern California it is at once the victim and the ornament of our Christmas festivities. The California Holly (*Heteromeles arbutifolia*) suffers also most in man's moments of merriment. Its red berries and serated leaves are very ornamental. We have the English holly in a few mountain localities, but not sufficiently accessible to be much used

One of the most beautiful of our native trees is the wild cherry of Catalina (*Prunis occidentalis*) confined in its native habitat to that island. It is a beautiful tree of dense dark-green foliage and glossy leaves, reminding one from a distance of a perfect orange tree.

The Lawson Cypress, so splendid and so useful a timber tree in damp soil, is perhaps the most attractive of the evergreens ; but it is not suited to all or even many places in the south.

When one commences a conscientious compendium of the beautiful trees of California the deserving aspirants crowd so fast around one that the task, to be properly performed, must be so unduly lengthened out as to be quite unmanageable in an article of this kind.

The oaks are well represented in California, and extend from the high Sierras to the bluffs by the sea, as at Santa Barbara. Of these the two most useful for timber are the Quercus Garryana and the Quercus oblongifolia. The rest of the family are now used mainly for fuel ; but with the better information as to the treatment of the wood, and the season at which it should be cut, many of our oaks will certainly be found otherwise useful. The Q. lobata is the large oak common in the central valleys of the State. It is often a great tree and picturesque ; but it is, in my opinion, never a peer to either the Golden Leaf Cañon or Iron Oak (Q. chrysolepis) of the north, or of our Red Live Oak (Q, agrifolia) of the south. Both these trees have at once a friendly dignity and a beckoning beauty that suggests on the one hand ancestors and respectability, and on the other picnics and love scenes.

There are two immigrants of the family that do remarkably well here, the English Oak and the Cork Oak. The latter is a good grower in Southern California, and the great commercial value of its bark should increase the planting of this tree. The gathering of the bark does not injure the tree, so its value on waste places is certain and of indefinite duration. In this respect it differs from our native tan-bark oak, the bark of which is so well known in commerce. This tree is cut down and stripped of bark, and the wood left to rot, or worse—to feed the flames that may thus gather force to destroy the young trees that would replace those cut. This oak is fast being exterminated, and as its wood brings the highest price in the northern markets for fuel it is an illustration of the waste now prevalent in all timbering and forest methods in this State.

There is one other tree whose treatment in this State distresses both the sentimental and the reasonable person. It is that splendid giant of the forest the sugar pine (*Pinus Lambertiana*). This tree is the largest pine tree of the whole world and a most valuable timber tree. It is distinguished by its sugar-like gum on wounds, by its long spineless cone, by its graceful habit, its great height and by its growing in forests of other trees and not in solid groves all its own. One of the peculiarities of this tree is the free splitting quality possessed by a certain proportion of them, but not by all. Taking advantage of this the shake-makers eke out a poor subsistence by tramping through the Sierras and felling every grand sugar pine they come across. Some split well ; a few lengths of these are used, but thousands upon thousands of feet of clear lumber are left to rot and feed the flames. Some do not split well ; and these are left entire, a menace to their fellows of the forest, and a source of sorrow to the sagacious. The shake-maker like the tan-bark gatherer is a trespasser, a violator of law and a thief of the public property. These two are the authors of the grossest waste in our forest exploitation.

Coming back to the pines we find this family in California exceedingly interesting. There are to start with more species on the Pacific Coast, and more in California, than in any similar area in the world. The Pacific Slope has twenty-three species, California eighteen, and there are besides ten well-marked varieties. We have the largest pine tree in the world, probably also the smallest, the one with the largest cone, the one with the smallest, the best nut producers, and the only pine with its foliage growing as solitary leaves instead of in bunches. Several of the species are only found in very restricted localities, as the Torrey and the Monterey pine.

If it were not for the Sugar Pine we would still have the finest and grandest pine tree of the world in the *Pinus Ponderosa* or Yellow pine. This tree extends throughout the mountain region of California, and with the Incense cedar and Douglas spruce forms the coniferous forests on our own southern mountains.

The Pinon Pine, the Digger Indian, the Coulteri, or big cone, all with large, sweet, edible seeds, grow in our driest and hottest foothills, and with the Juniper and Mesquit hold out a hope for turning much of our deserts to use. This latter tree has a gum similar to gum arabic, which it is now used to adulterate. It has also an edible seed much used by the Indians and Mexicans both for themselves and for their stock. Its wood ranks above oak for fire wood, and is practically indestructible in the ground. Of all trees in the world it has the widest range, extending from the deserts and plateaus east and west of the Sierra and Rocky Mountains through Mexico, South America, and crossing the Andes is found still in La Plata and Bolivia. It comes from the seed easily, and under favorable conditions makes reasonably rapid growth and a fine, good-sized tree.

And still we have said nothing of the California Laurel, our native and fragrant bay, whose wood is now so valuable for cabinet work; nothing of our alders, ashes, maples, firs, poplars, willows, cottonwoods, sycamores, walnuts, and other interesting trees, nor can we within these limits.

The *Scientific American* has the following additional details on the subject relating more particularly to the famous big trees of California. It will be seen that had it not been for the timely action of the United States Government in setting apart national parks the magnificent forests of the *Sequoia gigantea* would in a very few years be completely destroyed. It is to be hoped that the threatened fate of the remaining giant trees will be averted by the extension of the reserves so as to include much of the territory now being devastated by the wholesale destruction of these forest wonders:

In some twenty irregular groups, extending through a distance of about two hundred miles on the western slope of the Sierra Nevadas, from Calaveras through Tulare County, California, are found what are known as the famous "big trees" of California, one of which form the subject of our illustration, and, wonderful to relate, although a passage-way has been cut through it through which stages regularly pass, the tree still lives. This tree is in the Mariposa grove, and is 28 feet in diameter. A still larger tree in the same grove is known as the "Grizzly Giant." It is 34 feet in diameter. The highest of these trees is in the Calaveras grove, and it is 325 feet high.

This tree, the *Sequoia gigantea*, should not be confounded with the California redwood, *Sequoia sempervirens*, a tree which quite frequently reaches a diameter exceeding 15 feet and a height of 300 feet. The largest specimen of this tree is seven miles south of Santa Cruz; it is 20 feet in diameter and 366 feet high. The redwood is found from the boundary of Mexico northward, forming vast forests upon the Coast Range of mountains, never very far from the Pacific. The wood is light and close grained, much resembling red cedar in appearance; it splits with remarkable facility, is eminently durable, and is used for building purposes, cabinet work, and almost every variety of general wood work, forming the principal staple of the California lumber trade.

With such abundant supplies, therefore, of one of the finest varieties of lumber, it seems something more than a pity, but rather a matter calling for severe criticism, that the lumbermen should be permitted to destroy, as they are doing, with a few exceptions, these groves of *Sequoia gigantea*. These trees grow nowhere else in the world, and their beauty, grandeur, and marvelous age combine to make them objects of such surpassing interest that the folly and neglect of the government in permitting their present destruction will pass the comprehension of succeeding generations. The Calaveras grove, north of Yosemite valley, is still untouched, and the Mariposa grove, thirty-five miles south of the valley, is safe, because included in the Yosemite grant, but the Fresno Flats grove, the next one in the belt, is a scene of destruction. It belongs to the California Lumber Company, of San José. Their policy has been to slaughter the trees without regard to age or size, beauty or grandeur. This was once one of the most beautiful of the groves,

but to-day it is a pitiful wreck. Giants of the forest, fifteen, twenty, and thirty feet in diameter, lie on the ground in every direction. The largest trunks, those that are too large to be handled easily with the saw, have been shattered with blasting powder. Stumps of the trees, six, ten, or a dozen feet high, are all about, an army of witnesses to the malevolent avarice of men. Occasionally there is a mighty tree still standing, with a great gash, perhaps five feet deep, cut and sawed into one side. This grove has been almost annihilated. When the company cleans up the trunks and limbs that now cover the ground, its work of destruction will be just about completed. It has been engaged on this grove for a number of years, and has turned its attention almost entirely to the sequoias.

If the big tree lumber brought higher prices than any other sort, the zeal which is shown in the destruction of the groves could be understood. But it rates no higher in the market than the sugar pine, with which the mountain slopes are densely covered. The lumber companies could have made just as much money and been at no expense for blasting powder if they had let the big trees alone and turned to the sugar pines.

In the groves further south the same scene is repeated time after time. In that portion of the sequoia belt between the north and south boundaries of Tulare County alone there are at least ten mills, every one of which is industriously working away at the big trees. Their owners evidently fear that the national government will some day awaken to the wisdom of throwing protection around these unique groves, and they are determined to get just as much money out of them as possible before that day comes.

In the Fresno grove, which is on the line between Fresno and Tulare Counties, the General Grant National Park preserves a few of the big trees. It is only a square mile in extent, and does not include the whole of the grove. The rest of it is rapidly disappearing. A little to the southeast the Sequoia National Park includes the North Kaweah and South Kaweah groves, which were withdrawn from sale in time to save them from destruction. Through the remainder of the groves one comes upon the same scene again and again. Everywhere axe, saw, and blasting powder are doing their detestable work with speed and thoroughness.

It has been proposed to extend the boundaries of the Sequoia Park so that it will embrace all the sequoia groves in Tulare County and cover the mountain slope from the summit of the Sierras nearly to the lower timber line. If the proposition included the whole belt of the sequoias from the most northern grove to the most southern tree, it would be still more heartily approved by all those—excepting, always, the mill-owners—who have visited the groves and know how hopeless is their preservation in any other way.

CLIMATIC CHANGES.

It has been a matter of common observation of late years that the climate of the North American continent is undergoing a radical change. There are various opinions among scientific men as to the causes which have produced this result. The following article on the subject by Mr. E. B. Dunn, which appeared in the New York *World*, will be read with interest, as in addition to embodying his theory of the cause, which may or may not be sustained by further research, it gives some important facts and statistics, showing the extent of the alteration in meteorological condition. As will be seen, Mr. Dunn attributes the change mainly to the extent to which irrigation has been carried in portions of the "American Desert," creating a moisture in large atmospheric areas, and thereby deflecting the storm centres from their former course. If his hypothesis is sound, it is probable that the process of deforestation has had not a little influence in causing the change, as the forests have much to do with regulating the distribution of moisture.

There seems but little doubt that the climate is undergoing a change. For ten years the seasons have blended so gradually that no definite line has marked the outgoing of one or the incoming of the other. The winters, if we may call them such, have been mild and snowless, save with rare exceptions; while our summers, that formerly sent joy to our seaside and country resorts, now stand as history, and leave a sad remembrance of "what might have been" had not the seasons changed.

Numerous theories have been advanced to show a reason for the change. Some are without foundation, others have many plausible phases. The oldest inhabitants, looking back over their boyhood days, tell us that they can bring to mind cold winters and great snowstorms, covering a period of months, when the bare ground could not be seen and the sleighbells jingled from November to March. All these old fellows declare that certainly the climate is changing.

There are strong adherents of the claim that the Gulf Stream, pressing nearer to our shores, has caused the difference in our climate. They say that if the Gulf Stream didn't warm up the British Isles they would be as cold as Greenland. This is very doubtful, according to scientific investigations made by Mr. M. J. Thoulet. His researches prove that when the stream reaches the vicinity of Newfoundland, the depth and volume are no longer sufficient to exert any material action on the climate. This indicates that the old theory of the Gulf Stream being the only cause of the mild climate of the British Isles (if these investigations be correct) must be discarded and the real cause sought elsewhere.

This theory can, in no sense, apply to the change in our climate, for the reason that as yet we have no tangible proof that the Gulf Stream has changed its course, and if it has, it could not, in any sense, affect the climate of this country. Its waters may literally wash our shores, and yet the change would not be perceptible even in the coast States. For all storms and atmospheric phenomena pass from west to east. And the prevailing direction of wind being off shore, the winds would necessarily carry any change that might occur into the ocean.

Again, the rotation of the earth is a most important factor to prevent weather conditions travelling to the westward. These facts alone are sufficient to dispel the Gulf Stream theory.

Furthermore, the change in climate has not been of local nature, but has been as great or greater in the central valleys and extreme west as in this vicinity. Even the Southern States have, and are still undergoing considerable change. They no longer have their mild winters, as in former years. High pressure areas have followed each other in rapid succession into that vicinity, and caused the temperature to remain below the freezing point for periods equal in duration to some of the more northerly States.

In all the years since 1885, with but one exception, the climate in this vicinity has become gradually warmer. The following figures from the records of the Weather Bureau prove this. The annual mean temperatures show the total amount of heat received, and are best calculated to make the case plain, and are, moreover, trustworthy :

ANNUAL MEAN TEMPERATURE.

1885	49.8
1886	51.0
1887	51.9
1888	50.0
1889	53.5
1890	53.6
1891	53.8

The year 1888 was not only exceptional as to the order of steady change in temperature, but its eccentricities took form in especially rough storms and the blizzard of March.

The excess of heat for 1887 amounted to 212 degrees. There was, too, a surplus of 3.14 inches rainfall.

The year 1888 closed with a deficiency of 452 degrees and a surplus of 9.17 inches of rainfall. That year, with but one exception, is the wettest on record.

The year 1889 almost doubled the heat lost during the previous year. At the close of December there was an excess of 845 degrees of temperature, and a surplus of 15.15 inches of rainfall. This exceeded that of 1888 by 5.98 inches, and is the heaviest amount recorded by the Weather Bureau in any one year.

The year 1890 made a still greater effort, and piled up 918 degrees mean temperature above the normal It was also a very wet year, and closed with 8.76 inches of rainfall above the average.

The year 1891 ended with an excess of 586 degrees mean temperature, but was deficient 3.81 inches in rainfall.

The most remarkable feature, as shown in this excess of heat, lies in the fact that it was gained during the fall and winter months, while the summer months were cooler than the average. Many days of December, January and February have been warmer than a great many in June, July and August. This has been so frequent as to cause general comment.

The cause for such a change is not easy to trace, and all theories and deductions advanced to solve the problem can only be verified by a long series of observations, covering a number of years. It is necessary to start from the birthplace of storms that cross our country. The climate of some particular place must be determined by the number of storms and the passage of the storm centres to the north or south of it. If the storm centre passes to the north of this city, for instance, the warm southerly winds flow to the northward over us, but should the centre pass to the south the cold northerly winds would rush towards the centre, and consequently give us colder weather. The winds from all sides continue to flow towards the storm centre to fill the vacuum, and as they do so they blow spirally inward and upward, according to the movements of the hands of a watch. The winds from an area of high pressure have a diametrically opposite movement, and are thrown off from the centre, thus producing the colder weather when the centre is to the north of the given place, and warmer weather when south of it.

The prevailing conditions depend entirely upon the duration of these centres in passing as well as their frequency. Therefore, as the effect is apparent and well established, we must trace these disturbances to their birthplace to locate any change in their development or course. If we can assign any reason or show a cause why they should take a different course across the country than travelled in previous years, it is one step nearer solving the problem.

The storms that cross this country, or the majority of them, develop in the extreme north-west, beyond the limits of our country, or pass in from the North Pacific Ocean. Others, again, develop in the extreme south-west, or come in from the South Pacific. Very few cross directly over the central mountain districts. The storms that move across the mountain range, by the time they reach the eastern side, are almost entirely without precipitation. All the moisture they start with (which must be considerable to give them energy enough to cross the mountains at all) has been deposited on the west side, in consequence of the warm moist air meeting with the colder upper currents. For the winds are forced to a much greater height than would otherwise be the case. Therefore, by the time they reach the east side of the mountain they are dry. This accounts for the arid lands of the west. In nine out of every ten storms I find the movement of the storm centres towards the central plains on the east slope of the Rocky Mountains, whether they come from the north-west or south-west. They linger in that neighborhood, apparently with but little energy at first. Finally they develop and take a north-easterly course across the country.

Storms, like a current of electricity, follow a course of the least atmospheric resistance. Of this we are fully aware. Then why should most of the disturbances move into and over a country where the air is dry, and the greatest possible resistance is encountered, instead of moving off in a natural path? Because the land that was once an arid desert is to-day skilfully manipulated in a scientific way, so that 4,300,000 acres of land in Colorado, Nebraska, Wyoming and Utah are under a state of cultivation by artificial means. Irrigation has done for the central plains what nature has failed to do. It is

this great spreading of water over such a vast territory—this putting of an oasis in the desert—that has been the attraction to draw and assist in the development of storms in that vicinity. Thus they have been brought from a southerly into a more northerly course, leaving the great lakes the next nourishing place in a natural course. Thus the storm centres that in former years passed eastward over the central or Southern States and then up the Atlantic, find a much easier course over the lakes and down the St. Lawrence Valley. The high pressure areas then sweep to the south behind the storm, causing "northers" in Texas and colder weather during the winter months in all the Southern States. What remains of such cold waves after the centres of high pressure get to a position where we can get that portion of the wave which is due us is hardly perceptible. I cite, for instance, the year 1889, where twenty-nine storms crossed the country, twenty-eight of which passed to the north of this city and but one to the south. This of itself accounts for our warm winter of that year.

Now, we ask, is this state of affairs to be permanent? I am inclined to believe that if the theory advanced is correct and is really the cause of the change—and it seems in every way plausible—then the change has come to stay, so long as New Mexico, Arizona and Texas are left without irrigation. Just so soon as these States are irrigated the storms that come in or develop in the south-west will follow a course more towards the nearest watercourse, which is the Gulf of Mexico, thence across the Gulf or Southern States and off the Atlantic coast, drawing down the cold wave as in former years and bringing our climate into its natural seasons.

FACTS ABOUT TREES.

White oak timber is valued in shipbuilding.

Apple is excellent for food and fuel. Weaver's shuttles are made of the wood.

Of dogwood, weavers' spools and handles of carpenters' tools are made.

The wood of the American aspen or white poplar is used in the manufacture of paper.

Mountain laurel wood is used in making combs. The leaves are poisonous to some animals.

White ash is used in carriage works. It is poisonous to snakes. It is said a snake is never found in its shade.

Black birch timber is used in basket works, and that tree is claimed by the Indians as their natural inheritance. It emits a pleasant odor when burning.

The butternut is a tree that likes best a rocky, uneven soil, and in whose shade neither shrub nor herb will thrive. The bark is used as a dyestuff for woollens.

Curled and bird's-eye maple is a wood of the same family that sometimes have curiously arranged fibre, one with curves, the other with eyes, hence the name.

Black wild cherry timber is much valued in cabinet works. The bark is highly medicinal. The leaves when wilted are poisonous to cattle.

Witch hazel is a large and curious forest shrub. The small branches were formerly used for "divining rods." And an extract from it is valued in medical practice.

ADDRESS ON THE VALUE AND USES OF FORESTS.

The following address was lately delivered by Mr. R. W. Phipps to the students of Upper Canada College, and as it embodies the general principles of forestry it has been considered well to print it in this report:

It will be, of course, impossible in one short lecture to exhaust this subject. But, perhaps, we shall be able to make it sufficiently interesting for this afternoon, by attempt-

ing an abridgment in which it will be endeavored to give a clear idea in succession of the principal points of forest value. The first is

How Moisture is Retained in Forests.

The whole forest, in its natural state, forms a reservoir admirably fitted to receive large supplies of moisture, to hold it for a lengthened time, and to part with it at intervals well calculated to benefit the vegetation of the surrounding country. The bed of the forest is a widely spread surface. piled thick with leaves, twigs, pieces of fallen branches and remnants of decayed logs, covering another layer of the same substances, in a state of partial decomposition, overlying yet another strata completely decomposed, altogether forming a deep porous hollow framework, penetrated with a myriad of pipes, tubes, and aqueducts, and interspersed with millions of miniature cisterns. Then, every hollow on the surface is obstructed by fallen and rotting logs, blocking and holding in position the flow of water until the humus below fully absorb it, while the whole surface of the earth is crossed, recrossed and crossed again by a chequer-work of partially elevated roots, the box-like openings between which perform the same function. If we go below the surface, we shall find the solid earth beneath the mass of vegetable decomposition pierced everywhere with upright and porous pillars of wonderful tubular structure—the large and perpendicular tap-roots which many trees possess, passing deep into solid clayey strata otherwise impermeable, and sending through the triturated earth which surrounds them, a slow and steady supply of water to a thousand subterranean and spring-feeding channels, which travelling away from the forests and under the cultivated fields, supply the great lower bed of moisture that is continually rising, fertilises the upper soil, and finally passes off to find in brooklet, lake or river, their course to ocean again. On this great natural bed and reservoir, rain may fall in torrents, only to be held there in suspension till it gradually, and in such degrees as are best fitted to promote the beneficent work of nature, flows away in curving creek, in rippling rivulet, nourishing and feeding the thirsty earth as it goes. On this same great bed, vast mountains of winter snow may pile themselves, protected by the overhanging branches and dense thickets of underbrush, against too rapid thaws in spring, thoroughly moistening and soaking the whole great mass of humus and roots, and furnishing a vast field for evaporation ready to part with its watery treasures to the surrounding atmosphere, at the fervent bidding of the warm sunbeams of April or May, the period when vegetation needs them most—the period for which nature has stored them, and at which she delivers them, and the period, if you notice, at which she takes care no dense foliage obstructs the action of the sun. Then, reversing the precess, when in times of drouth, the forest bed has parted with its surface treasure of moisture, the deeper roots can and do draw from the subterraneous and concealed channels, a vast supply for the trees themselves, which again passes through the leaves into the air and falls in rain or dew.

Moisture Supplied to the Air by Forests.

The forest land being always shaded by the dense masses of foliage above, from the summer sun, is then much cooler than the surrounding earth of the open country, a coolness increased by the damp atmosphere within and surrounding it, produced by the exhalations of the leaves, by the droppings of the great accumulations of dew, which collect on its great extensions of leaf surface in the course of the night, and by the evaporation from the ground itself, which, as before observed, is almost a perpetual bed of moisture. The amount transpired by the leaves, as shown in the preceding paragraph, is enormous. The forest then, is continually sending out and sending upwards, dense accumulations of vapor. It necessarily sends them upwards. the vapour of water being the lightest and most inclined to rise of all vapours. Therefore, there will be above the forest a large stratum, or it may be a column of air holding in solution as much vapour of water as it can bear without forming a cloud, and thereafter in due time to be precipitated in rain. What may occasion this we will speak of further on.

Moisture Increased by Prevention of Winds.

Another cause which adds to the moisture in the fields surrounding a forest is the great influence it exerts in modifying the force of the wind. When the stratum of air immediately above the field has, in drying the fields, taken up a portion of its moisture, that moisture will pass off slowly to the stratum of air above, and that in turn to the next above; but if the stratum of air next to the ground be rapidly moved across the ground by the wind, it is no longer simple evaporation into one stratum, that portion of stratum moves off immediately with the wind, and is immediately succeeded by another portion of the same stratum, and that by another and another as rapidly as they can pass over the ground, each in turn taking what moisture it can rapidly imbibe. Therefore, a portion of country protected by an adjoining forest from rapid winds, may remain, although exposed to sunshine for weeks, in good moist and growing condition, while a rapid drying wind passing over it for even one day might have taken from the ground much more moisture than it could spare, and have very injuriously affected the crop. To prevent this is one great use of even very thin lines of trees.

Action of Forests in Distribution of Rain.

To understand this, we will glance at the structure of trees. We will notice that in the first place these receive their nourishment from the roots, this passes upwards to the leaves, the vehicle which carries it up being water, which, having discharged this operation is largely thrown off from the leaves in the form of vapour. Much fresh nourishment is also received through the leaves, mingled with that which has ascended from the roots, and both together are then distributed through every part of the tree. But what we have to notice here principally is, that the great quantity of moisture necessary as a vehicle passes away from the leaves into the atmosphere. The quantity so passing from a forest is immense, forming a great body of vapour heavily charged with moisture continually rising to the clouds.

We will now notice that the supply of moisture for the world comes principally from that vast volume of vapour which rises from the equatorial ocean belt, and passes away on each side to the north and south poles. This is a much warmer body of vapour than that arising from the forests, and wherever these two meet, precipitation naturally occurs and showers of rain are the result. Where no forests exist rain is produced by other causes, such as the mingling of the polar and equatorial currents of air, but in these cases rain falls in heavy torrents. The value of the forest in this, is not so much that it increases the quantity of rain, as that its action tends continually to distribute it in fertilising showers instead of heavy falls. A valuable writer on the forests of Maine thus exemplifies the matter:

First, Trees shade the ground and thus prevent the sun from parching away the water contained in the ground, which accordingly stands its chance of ultimately reaching mill wheels. Our forests being for the greatest part evergreen, shade the ground at all seasons. They check, therefore, the waste of winter snow as well as the waste of summer rain. Nothing is more common than for patches of ice formed of solidified snow, to be found lying here and there in the defiles and ravines of our woods as late as early June, saturating the ground about them in their melting and sending off streamlets to the nearest brook, lake, or river.

Forests check the movement of the atmosphere, both the horizontal and the vertical, one or the other of which is always in circulation, and thus prevent or diminish the removal of moisture from their area of occupation by the connective power of the winds. This is a circumstance of great importance, as may be inferred from the rapidity with with which the roads dry up, or clothes from the laundry dry off during the prevalence of wind. Our woods being so largely evergreen check the movement of the winds at all seasons, and abate evaporation therefore at all seasons, a matter of some consequence since evaporation goes on from snow and ice, and from water at all temperatures, and is accelerated by wind from four to ten fold, as experiments show, and according to circumstances whatever the temperature may be.

In the fourth place, forests roughen and break up the ground through which their roots force passage so that water can penetrate it; and so that in innumerable depressions and sinks formed by the heaving ground over the roots, its volume when in surplus can be husbanded against too sudden removal. This is especially important upon hilly and mountainous watersheds contributing to their uniformity of discharge.

Lastly, as was observed in the section on mountains, forests cover the ground beneath with masses of vegetable matter which holds water like a sponge, and thus favor the uniformity of the volume of the connected rivers.

The combined and last result of all these influences is to increase the amount of water that shall, other conditions favoring, be available for manufacturing. The further result is to regulate the supply or delivery of the water, in which respect the function of forests is probably of not less importance than in regard to the volume of water. In one word, forests contribute in a very important measure to the two prime essentials of water power, namely, its volume and constancy, their influence in this respect being exceeded by only that of lakes and surface materials.

In the next place, I must mention when I speak of a forest, I do not wish to be understood as speaking of a level sward of close bitten grass. Over such a surface the rains fall and flow away as over a barren field. To allow forest ground its benefit to the surrounding country, it must be allowed its opportunities of indulging in undergrowth. If necessary, cattle must be kept completely out from the circle of the forest, in order that the young trees may spring up. For, it will be very plain to you, that if no young trees arise the forest cannot be perpetuated. What we need in a forest which is to serve its proper purposes, is a continual succession of bright undergrowth, concerning which, the great law, the "survival of the fittest," shall give us a succession of younger trees ready to take the places of those which are mature and are properly cut down and used. But it should be here remarked, that if tolerable pasture be allowed outside, cattle will never injure a forest.

A grove may be very well established, so that at all hours of the day cattle will find shade around its edges without being allowed to enter within its bounds.

And now I will enter upon another form of forestry. I want to impress upon you the idea which doubtless many of you comprehend already, the idea which is largely practiced in many lands, that of forming plantations of trees. We have been so much in the habit in these northern countries of relying on the original forest which now is fast leaving us, that it is time we noticed what is done in other lands. Large spaces of ground are chosen and planted with trees. In the first place, the ground must be so thickly planted with young trees as to shade the soil. In the next place, these young trees at the proper time must be so thinned out as to allow the ultimate trees room to grow. The reason of this is, that if we planted at first isolated trees, they would grow to branches and form nothing but knotty timber, while, if we grow them close together they will form tall upright columns of clear wood. Therefore, if you try plantations, grow your trees as closely together as nature will permit.

If the question be what trees may most beneficially be planted, the answer is, that if we plant the walnut we cannot expect good merchantable lumber until sixty years. The cherry or the hickory will give you valuable lumber in half the time, the pine in fifty years. Nearly all others in thirty years. All these seem long spaces to look forward to; but it must be remembered that the land is always the more valuable for having them upon it. I may instance here one grove whlch I have examined in Illinois. It has been planted in walnut for forty years, it is but fifteen acres in extent. The owner of the farm said to me, "My farm is nearly four hundred acres, but in twenty years that walnut grove will be worth three hundred thousand dollars, and will be worth more than all the rest of of the farm.

I would like here to emphasise the benefits to be gained by planting rows of trees on the exposed sides of farm lands. In the first place, we need shelter from the winter winds. All of us are aware how desert and bleak it is to travel or to live in our northern climate when the forest has been cut away. Rows of trees properly planted can easily remedy this. And for these purposes, I would recommend the evergreen rather than deciduous trees. Rows of the Scottish larch or of the Norway spruce, or perhaps,

best of all, of our own Canadian pine will answer well. I would recommend that these rows be double instead of single, the double rows to be fifteen feet apart. Undoubtedly some land would be lost by this process, but all loss will be more than repaid by the increased comfort of the residence and by the increased fertility of the land.

Men of our Canadian race, in whose strength we trust that a great Canadian empire yet shall stand, I ask you, preserve the trees, plant them as windbreaks around your farms, plant them in plantations near your house, let the branches wave and let the glad foliage of each succeeding spring say that they are there and that you are of them. If you wish near your residence that which shall arouse in you great and noble ideas, then have near you a grove of trees. In the absence of all other companionship, their companionship is perpetual. The wood, the whispering tenants of the grove, will always please you, will always, however desolate the world may seem, convey contentment to your heart. Finally, do not, I ask, make of your lands a waste of sand or clay. Give the trees a proper place ; let them be, as they will be if you allow them, a shield against the biting winds of winter, an assistant to all the crops your fertile field should grow. Let not our country degenerate, as older lands have, to a barren waste of stone and sand—countries which destroyed their forests. Let us rather remember that, as has been well said of old, the trees preserve the grass, the grass feeds the cattle, the cattle preserve the land, the land grows the man.

Keep a Grove Near.

How pleasant within easy walk of your house to have a woodland of five, of ten, or still more pleasant of fifteen acres. Let it not be a mossy wilderness of grassy land and old and dying timber, but a well fenced territory, where infant, half grown, and full-grown trees uninjured and fresh, cover the ground, clear cut of frame, tender and glowing of foliage as the bowers where Melibœus walked or Thyrsis sung. Enter for fifty steps, the world is gone ; a hundred and the solitude is utter. Without, it is the hottest of midday suns ; but the great leaf-roof above fills every sylvan arch with cooling shade, and passing where you will along these natural colonnades you breathe great draughts of life-giving forest air redolent of pine and balsam. On all sides outer sound is shut from you, the distant city bells are all unheard, the nearer mill has but a watch's tick ; even the harsher noises of farming life approach the ear with muffled and not unpleasing touch.

Here is repose, for here is distraction from outer cares. Notice that the forest has a population of its own ; and if you have not been a destroying tyrant but hospitable to the little harmless savages of the wilderness, a thousand lives will be around you, the existence of which you knew not. In yonder hollow, now seen, now hidden, the partridge is feeding her half grown brood ; the squirrel upon the leaning sapling beside you, glancing down with a half-friendly, half-careless air, is carving with his sharp curved teeth one of last year's nuts ; and in the insect life on ground and fallen tree are bustling communities, colonies, monarchies, or empires, for what we know, crossing, meeting, working, assisting as if everything hung on their efforts, you were nobody and space were outside the fence.

Here is the home of retirement, the seat of contemplation, the birthplace of thought. He who has near him such a solitude may rear heroes, for the murmurings of the mighty trees roll laden with the whispers of ambition to the youthful ear ; he who has it may hope for statesmen among his sons, for the converse of such a wilderness has nurtured throughout successive ages in many a succeeding race, in many a youthful and patriotic heart, the plans which in after days bore richest fruit of national life and national greatness.

If any of you should wish some practical ideas as to the best description of trees for windbreaks, I have noticed that those who have planted evergreens are best satisfied. Three evergreens, as remarked above, make an excellent windbreak. The first is our own Canadian pine, the next the Norway spruce, the third the cedar. I have known these three grow and flourish on so many different varieties of soils that it may be said they are suited to most localities. There is yet a fourth which I have observed makes a

very beautiful windbreak, but which is not yet so generally used, I mean the Scottish larch, though not exactly an evergreen, it forms a link between the evergreen and deciduous trees. The Norway spruce must be purchased, as must the larch, but the cedar and pine are often obtainable in our own fields and forests. It will be found best to take them from black, swampy lands, a much better root being there obtainable than when taken from sand; and it must be always remembered not to allow the roots to dry. As to size, I have known them to succeed well when planted five feet high; but my own method would be to confine them to three feet in height if they could be procured.

I take my leave of you now. The principles I have stated this afternoon you may rely upon. It is not I who speak, it is the voice of every century past saying, preserve your trees.

VILLAGE IMPROVEMENT SOCIETIES.

Something has been done by individual effort of late years to beautify the country by planting trees along the highways and on private grounds. But the movement here is not nearly so widespread as it should be, or as it is in the United States, where a great deal more attention has been paid to the subject. The advancement of public opinion as regards tree-planting for adornment across the lines has been greatly hastened by the establishment of village improvement societies by which organised effort is brought to bear on the undertaking, and the influence of the leading men in each community enlisted in the good work. In addition to the active and practical operations of these associations by means of which many villages whose highways were once bare and uninviting have been made models of sylvan beauty, they have done much by discussion and the publication of their ideas to awaken a general and far-reaching interest in tree-planting and forestry.

If similar associations could be organized throughout Ontario it would lend a marked impulse to the movement in favor of tree-planting by placing it on a broader footing and stimulating the apathetic and careless by the example of the more progressive and public-spirited. No one who has travelled much in the United States can have failed to notice how much more has been done to improve the aspect of the towns and villages than is the case in Canada. If the healthy impetus of local pride could be turned in the direction of beautifying the streets and homes of each community, each vying with the rest as to attractiveness, equally beneficial results would soon be noted amongst us. The following article by Mr. B. G. Northrop, which is taken from the *American Agriculturist*, gives some idea of what has been accomplished by means of village improvement societies:

The homes of the American people to-day are in happy contrast with those of fifty years ago in their architecture and surroundings. Of the many agencies tending to this result, none has done more than the hundreds of village improvement societies now scattered widely over the country. Their influence has not been limited to the towns, counties or States where they have been organised, for the discussions they have prompted, and the plans and ideas thus advocated by the press of the country, have benefited and brightened thousands of homes. The recent advocacy of village improvements by leading journals has given a strong impulse to this movement, so that more of these societies have been organised during the last year than in any previous ten years. It is an index of its value that practical and unsentimental railroad corporations now facilitate this work because it tends to improve and build up towns on their lines.

Though much has been accomplished—far more than I ever expected to witness when enlisting in this service, over twenty years ago—yet, compared with the public needs and the rich opportunities now opening on every hand, this work seems just begun. The most progressive and public-spirited communities are the very ones that are specially appreciative of organised efforts for the general good. Our best towns, without an improvement society, often fall far short of what they might be and ought to be, for in them, here and there, are found neglected private grounds, dilapidated dwellings, barns

and sheds, or a street fronting the house ugly with piles of decaying brush, or chips, old cans, harrows, carts or sleds, a fence with missing pickets, or a disabled gate which gives an air of shiftlessness sadly marring the effect of an otherwise beautiful village.

When an improvement society once develops private taste and public spirit, such defacements disappear. Where every citizen is thus stimulated to make his own wayside free from rubbish, and then neat and attractive, the entire town becomes so inviting as to give new value and attractions to all its homes. It is high praise to any people that they fondly cherish their homes. A stranger can hardly drive through such a town without saying, "Here are people of refinement, who tastefully guard the surroundings of their daily life." These surroundings, trifling as they seem, may be constant factors in forming character. Clearing up, dusting and putting things in order are little matters in parlor or sitting-room, yet how soon would each become forbidding were these trifles neglected. Just so in a village; let minor matters be neglected or slighted, and the comfort, content, reputation, and prosperity of a whole community suffers. But, worst of all, home life suffers, and character deteriorates. Modern civilization relates to the homes and social life of the people, to their health, comfort, thrift, and their intellectual, social and moral advancement. In earlier ages, men were counted in the aggregate, and valued as they helped to swell the revenues or retinues of kings. The government was the unit, and each individual only added one to the roll of soldiers or serfs Happily for us the family is the unit of the State, and government is for the people as well as by the people. This gives to the concrete all the characteristics that make the home beautiful and attractive. Thus, love of home is primary patriotism.

When recently surveying a town, in order to adapt my lecture to local needs, as we passed a large house and spacious barns, with all the surroundings neglected and forbidding, my escort said: "Here lives the richest and meanest man of our town. Twenty years ago he brought here a refined young lady as a bride. For a few years it was her ambition and delight to adorn her new home without and within. At length her strong, innate love of the beautiful was cruelly crushed, for this thoughtless, if not heartless, wretch 'would no longer permit such waste of her time on good-for-nothing posies.' Driven to despair, she has been for years in the asylum among the incurably insane."

This may not be a typical case, but it contains a warning of wide application. While the pursuits of farmers, under right conditions, are highly favorable to health and longevity, too often they, and still more their wives, seem specially liable to depression and insanity. The farmer's home should be social and sunny. However humble, it may be tasteful and attractive. The isolation of the farmer's dwelling should suggest the wisdom and necessity of providing home enjoyments and fostering home courtesies. As flowers seem worthless only to the senseless, so the morning and evening salutations in the family may seem little in themselves, but, when fitly observed, they are constant forces, and therefore mighty in their influence. As the sunbeam is composed of many minute rays, so every farmer's home should be illumined and brightened by Nature's richest hues without, and, still more, within, by all the sweet amenities of life. These amenities and affections may be and should be, the sunshine of every home. They refresh and purify the social circle. Like the clinging vine, they twine themselves around the heart, calling forth its strongest affections, and securing its happiest and most healthful activity. Such affections dignify homely drudgery, make tough toils pleasant, painful sacrifices easy, and perils and privations cheerfully endured. Under the inspiration of such affections, there is often a genuine heroism in the home, unsurpassed, if not unequalled, by any which the world lauds on the battlefield.

The isolation of the farmer's home does not warrant gloom of mind or dreary surroundings. His home should be one of intelligence. Farming need not be a plodding routine life. A first-class agricultural paper is a good investment, that he may know the best agricultural processes and products, improvements and stock. For his own sake and that of his family, current events at home and abroad should be familiarly discussed. Brain and muscle need to work together, for the highest health of each. The dull and stupid are short-lived. The farmer works most cheerfully when the mental horizon is

broadened, so that he looks far beyond the sphere of his daily work. How many homes, even on the Western frontier, have been the abodes of intelligence, courage, industry, contentment and good cheer, where early hardships have developed noble characters that made the desert rejoice and blossom as the rose.

When in Nebraska city, the guest of an ex-governor of Nebraska, I found a happy contrast to the miser's wretched home. To this State, then a Territory, just ceded by the Indians to the United States, and still a wilderness, he brought his bride, a cultivated lady from Detroit, who cheerfully made the best of their log hut. Soon flowers, shrubs and vines sprang up on every side, until at length a veritable Eden, largely planted and tilled by her hands, surrounded that humble home, and in a few years a stately mansion, beautiful within as well as without, rose in its place. How much did her love of the beautiful and her purpose to create this paradise on which her heart was set when she first saw this spot, and saw, too, its possibilities, lighten the burdens and lessen the privations of a pioneer life. Bright visions of a beautiful home were an inspiration and a benediction to that happy household years before they were fully realised.

It seems fitting that such a home fitly named "Arbor Lodge," should be the birthplace of Arbor Day. It was a happy idea to designate a given day when all should unite in the work of planting trees. This honor belongs to Ex-Governor J. Sterling Morton, of Nebraska. The first proclamation for the observance of such a day was made at his suggestion by Governor Furnas, of Nebraska, and it is said twelve millions of trees were planted on the day thus designated. It was soon established by law as a legal holiday, and provision was made for awarding premiums to those who set out the most trees in its observance. The prizes offered for tree-planting secured definite statistics from official county returns, annually made December 31st. At the American Forestry Association held in Boston, September, 1885, Ex-Governor Morton said: "Arbor day has worked well in Nebraska, and we have growing in that State to-day more than 700,000 acres of trees which have been planted by human hands." The rapidity of growth of the forests first planted, not only cottonwood but more valuable timber trees, and especially the favorite black walnut, was a grateful surprise. It demonstrated the value of these trees for fuel, fences and lumber (the special need of treeless prairies), so that a great impulse has recently been given to this work. The latest figures are so enormous as to seem incredible to those who have not witnessed the interest, not to say enthusiasm of Nebraskans, in this work. So broad and beneficent have been the results of the Arbor Day movement in Nebraska, that its originator is there gratefully recognised as a benefactor of the State, now the leading State of America for tree planting. It glories in the old misnomer, "The Great American Desert," since it has become so habitable and hospitable by cultivation and tree-planting. Where twenty years ago the school geographies said trees would not grow, the settler who does not now plan for tree-planting is the exception. The Nebraskans are justly proud of this great achievement and are determined to maintain their pre-eminence.

The laborers of France and Germany socialise far more than American farmers. The festive spirit is a marked feature of their character. It is manifested in the family, for young and old, rich or poor, all take their outings together—in neighborhood meetings, in processions and various social gatherings. Whole families seem to enjoy everything together as they visit the beautiful gardens and woods which abound in or near their cities and towns. In Germany, this genial spirit is everywhere fostered by music, vocal or instrumental. As every one sings, a concert may be easily extemporised at every such picnic. As a result, there is an inexpressible something in the German character that carries mirthful and happy childhood into old age, giving an added charm to social life, and lightness and cheer to sober work.

Village improvement is often carried on by individual, as well as by organised efforts, where a citizen or a family of liberal views and large means become benefactors of their native town, and thus by example and personal influence awaken town pride and public spirit. Norfolk, Conn., furnishes a striking illustration of this kind. Twenty years ago it was a declining town. Now it is a favorite summer resort, proud of its recent growth and prosperity, and grateful to the families that have caused this transformation. Such an

example should prompt others. How many men of wealth in our favored age, like the Battell and Eldridge families in Norfolk, are enriching their own lives in becoming benefactors of their native towns by gifts for libraries, schools, cemeteries, fountains, parks or other institutions or improvements. It is a privilege to witness their happiness in seeing the fruits of such beneficence. What a contrast such noble characters show to the grasping and avaricious niggard—unhappy and unloved in life and unmourned in death.

PLANTING FOR IMMEDIATE EFFECT.

It is often the case that trees are planted extensively and set closely together for ornamental purposes, and allowed to grow up to maturity without being thinned out. For the first few years the effect is pleasing and the trees flourish as a rule much better than if they had been planted at long distances apart. But before long they begin to crowd each other. They have not room to expand and put forth their branches and if left to themselves, grow much as they do in the forest, long straight sticks with the foliage all at the top instead of presenting a leafy expanse of verdure at a short distance from the ground. Hence the importance of applying the thinning out process at intervals so as to leave each tree with ample room to spread. The following article from the pen of Mr. A. S. Fuller, which appeared in a late issue of the *American Agriculturist*, will be found instructive upon this point. The experience detailed will help to correct the impression that all that is needful to improve the appearance of a farm is to plant trees once for all and then leave nature to do the rest. That, of course, is better than nothing, but it falls far short of what can be done by judicious thinning out as the trees mature :

When I purchased part of an old farm in New Jersey, which has since been my home, there was not a square yard of grass upon it, nor a fruit tree or shrub except those growing in hedge rows, fence corners and in and around an old stone quarry in a corner near the highway. The outlook for a cozy home was anything but inviting, but it was in the country far away from the everlasting bustle and din of the city, and this was something to one who sought a quiet retreat and pure air, where he might build and plant to suit himself.

The first thing thought of after building a house and barn was a bit of green grass, and being somewhat doubtful about seed growing on an old worn sand bank, the roadsides were laid under contribution, and soon we had skinned enough of them to give us a few square rods of sward or just an edging of acres of lawn which I hoped to secure at less cost a few years later. The fruit trees and vegetables came next in order, and all, by much coaxing, flourished moderately well, but upon the approach of winter and as the deciduous trees and shrubs dropped their foliage, our surroundings seemed cheerless, cold and desolate, and the want of something green was not only seen but felt, for the cold north-west winds swept over the place, driving even the winter birds, squirrels and rabbits away to the woods for shelter.

My first winter here was enough in the way of experience to show me that evergreen trees of almost any kind would add greatly, not only to our comfort but to the general good appearance, too, of my grounds, so in the spring a special effort was made to plant as many as seemed desirable. Pines of various species, spruces, arbor-vitæs, hemlocks, balsams were selected, not omitting the Kalmias or laurels, hollies and other native undershrubs with evergreen leaves. Many of these were obtained from the woods, costing nothing but the labor of digging, hauling home and planting ; others were purchased at a nursery a few miles distant. One week, with a team and three or four men, was sufficient to make a wonderful change for the better in the general appearance of my surroundings, and it has steadily improved ever since, as the trees increased in size, and new kinds were added.

At first novelties and rare species were not sought for, but those most readily obtained accepted, because the most common and cheapest would afford shelter and warmth as well as the rare and costly, and look just as green and cheerful when the snow covered the ground in winter, besides some of those usually classed among the cheap and common,

like the white pine and hemlock, should never be omitted, even from the most select list of hardy compeers. The kinds obtained were planted freely in groups, rows and as single specimens, and as usual in such cases I sought "immediate effect." and in carrying out this idea several trees were planted where there would be room for only one to grow up to maturity. But, having confidence in my own courage to cut down a beautiful tree when it became necessary, rather close planting was the rule followed. For instance, in one group of Norway spruces planted between my house and barn, eleven trees were set, ten have since been removed, and the one remaining is about fifty feet high and the lower branches cover a considerably larger area than the entire eleven did when first planted.

During the first five years after planting, and as thinning out became necessary, we thought little of it, for a few strokes of the axe would cut a tree down, and to haul it away to the brush heap involved but little labor, but as the years passed and the trees enlarged, the cost of removal became greater and now it is the work of hours, and sometimes days, to get rid of a tree twenty-five years old. Our ten minutes spent in planting have grown to ten or twice ten hours in its removal, and we are learning from some experience that planting for "immediate effect" may become a rather costly investment. It seems to be the general practice, however, in both private and public grounds, but the thinning out at the proper time is as generally neglected, and as a result all of the trees are ruined.

We have only to visit our public parks to see what "immediate effect" and "future ruin" means, and perhaps the two most striking examples of neglect are to be found in the Central Park of New York and Prospect Park of Brooklyn. In the former, the woodman's axe has been heard for years, cutting away worthless timber in the vain hope of saving a few fair specimens out of the hundreds that are being destroyed. In Prospect Park, however, the axe has not, as yet, been laid at the root of any great number of trees, although sadly needed, and every year it is delayed only increases the difficulty and will make the impending ruin the more complete. The crowding of a hundred trees into a space where ten would have been ample when planted, and even to produce the immediate effect sought, is now painfully apparent in the rapidly advancing ruin and decay of all. To thin out and remove the most worthless specimens at this time will call for an expenditure ten times the original cost of the trees, and when it is done there will be left a few long-legged specimens of the hop-pole type instead of wide spreading, beautiful trees such as nature produces when afforded room for development.

This very prevalent system of crowding and massing of trees and shrubs has not only been extensively practiced to the great detriment of nearly all private and public parks, but often extends to small gardens, where numbers of specimens is the ruling idea instead of perfect and fully-developed ones. The disastrous effect of the overcrowding of ornamental shrubs and trees becomes even more obvious in small places than in large, open grounds, where distance and massive effects make the defects of individual specimens less apparent to the passer-by. It would seem that we have plenty of artists in ideas, but few of execution. There is no end of beautiful designs in landscape gardening, but whatever merit they possess is lost in transferring them from parchment to mother earth. To plan is one thing, execute quite another, and the artist who attempts to design an ever-changing and progressive landscape must be able to look ahead, not ten years, but ten times ten, else his æsthetic ideas will soon be enveloped in chaos and moldy ruins.

ARBOR DAY IN SCHOOLS.

An excellent American custom, which has been wisely introduced into the schools of Ontario by Hon. Mr. Ross, the Minister of Education, is that of setting apart a day in spring to be observed by the pupils of our public schools as "Arbor Day." Nothing is calculated to encourage in after life a love for the beautiful in Nature and a desire to protect the forests and shade-trees from destruction more than an observance in which the children are taught to take a practical interest in the planting and growth of trees. The boy who has with his own hands planted a sapling and watched its growth year by

year until it becomes a landmark and an adornment to the neighborhood, has gained an experience which will bring home to him the value and pleasure of tree-planting far more than any amount of study could do.

The principal drawback to the practical success of "Arbor Day," so far as it has been observed in Canada, is that the area for its operations has been mainly, if not altogether confined to the school grounds. The space is too limited to allow of much tree-planting, and when the portion which can be set apart for trees is taken up, Arbor Day bids fair to degenerate into a mere formality. This should not be the case. Why could not the useful and practical nature of the custom be extended by having some of our tree-streets and public places planted by the public school pupils? If Arbor Day is to be a means of giving the young an insight into the principles of forestry, and combining actual results with theoretical instruction, the School Boards should see to it that its benefits are not lost for want of the means and opportunity to make plantations on an extensive and permanent scale. Mere playing at tree-planting will accomplish little of the good sought for.

In the United States Arbor Day has obtained general recognition, with the happiest results. The following synopsis of an address recently delivered by Mr. B. G. Northrop, of Clinton, Connecticut, before the Massachusetts Horticultural Society, conveys some idea of what is being effected by this means in influencing public sentiment in favor of tree-planting :

Arbor Day was first proposed by ex-Governor J. S. Morton, of Nebraska, in 1872, from the economic standpoint ; the great problem then was to meet the urgent needs of vast treeless prairies.

Arbor Day in schools was first suggested by Mr. Northrop, and was educational in its origin. Mr. Northrop's pioneer work in this direction met with indifference, and even opposition, from educational authorities,—but now the idea has become generally accepted, and Governors and school superintendents, who at first were apathetic, on fuller information have worked heartily for the adoption of Arbor Day. The logic of events has answered objections. Wherever it has been fairly tried, it has stood the test of experience. Now such a day is observed in thirty nine States and territories in accordance with legislative Act, or by special recommendation of the Governor or State School Superintendent, or the State Grange, and the State Horticultural and Agricultural Societies, and in some states by all these combined. It has already become the most interesting, widely observed and useful of school holidays.

Arbor Day has fostered love of country. It has become a patriotic observance in the Southern States, which have fixed its date on Washington's birthay. It was a scene of thrilling interest at De Funiak Springs, Fla., when an enthusiastic crowd, young and old, gathered to plant a State tree for every State in the Union around their beautiful lake, besides memorial trees to Washington and other patriots and philanthropists ; a brief State panegyric was made at the dedication of each tree.

This custom of planting memorial trees in honour of Washington, Lincoln, Grant, Garfield and other patriots, and also of celebrated authors and philanthropists, has become general.

Who can estimate the educating influences already exerted upon the myriads of youths who have participated in these exercises? This custom has been heartily commended by the eminent authors of America. The Arbor Day circulars within the reach of every scholar contain choice selections in prose and poetry on the value and beauty of trees. What growth of mind and heart may come to our youth as they learn these rich gems of our literature, and still more as they are thus led to apply them by planting and caring for trees! What multitudes of youth have thus united sentiments of patriotism and the study of literature and history, with the love of trees, vines, shrubs and flowers, and thus with the love of nature in all her endless forms of beauty!

In the school geographies pupils learn of the trees and plants in foreign lands, while they are ignorant of those growing right about them. One farmer in Norfolk, astonished on seeing those varieties, admitted that he could not distinguish one-half the kinds of trees found on his own farm. Professor Brewer, of Yale University, says: "I have recently

talked with students, sons of well-to-do families, who could not give the names of three kinds of trees in our streets. They have grown up as ignorant of the trees of our forests and the crops of our fields as a Hottentot grows up ignorant of the stars." At the American Forestry Association, at St. Paul, Minn., the president of the School Board of that city, while advocating the resolution in favor of Arbor Day, said: "I am confident, from conversation with them, that not one in ten of the teachers of this city can recognise by sight ten of the commonest trees growing in this region." Since that date what a change has Arbor Day wrought in the sentiments and practical attainments in this line of both teachers and scholars.

Habits of observation have been formed which have led youth in their walks, at work or play, to recognise and admire our noble trees, and to realise that they are the grandest products of nature, and form the finest drapery that adorns the earth in all lands. Those talks on trees, which Superintendent Peaslee says "were the most profitable lessons the pupils of Cincinnati ever had in a single day," occupied only the morning of Arbor Day, the afternoon being given to the practical work.

Since 1883 our schools have rendered new service to the State, as well as to their pupils, by leading them to study the habits of trees, and appreciate their value and beauty —thus tending to make practical horticulturists and arborists. How many of these children in maturer years will learn from happy experience that trees, like grateful children, bring rich filial returns, and compensate a thousand fold for all the care they cost? George William Curtis says: "Arbor Day will make the country visibly more beautiful year by year. Every school district will contribute to the good work. The school-house will gradually become an ornament of the village, and the children will be put in the way of living upon more friendly and intelligent terms with the bountiful nature which is so friendly to us."

In New York 77,082 trees were planted in three years, and in 1891 8,955 school districts observed the day.

Indiana and Pennsylvania have kept Arbor Day both in spring and autumn. Pennsylvania is still the banner State in this work, by reason of the enthusiastic efforts of the late Dr. Higbee, who made earnest appeals to all teachers, school officers and friends of education, "to give this good work all possible encouragement, putting the thought and work of tree-planting into the schools. The boys and girls should be encouraged to collect and plant seeds and nuts of various kinds, and watch their growth and care for them. This is a work not for a day or a year, but for the profit of the succeeding generations. Every teachers' institute should discuss this subject, and every normal school should give it earnest attention." Over 300,000 trees have been planted on the successive Arbor Days in that State. Who can estimate the influences thus exerted on minds as well as on grounds—influences that will go on broadening through all time? In Illinois 10,000 districts were reported as keeping the day.

Maine reports: "After six years' observance, Arbor Day is growing more in popular favor, through the efforts of the press, the granges and the schools." Iowa has observed this day with peculiar interest. An elaborate circular has been annually sent to each school. The special effort last April was to develop local patriotism—State, county and town pride.

Many school grounds are too small to admit of ornamentation; sometimes smallest where land is cheapest, and totally inadequate to the necessities of the schools. Arbor Day has started efforts for their enlargement. State school reports now widely call attention to this defect, and urge that every school contain at least half an acre of land, and much more if possible.

Arbor Day in schools has proved an effective method of calling attention to the importance of economic tree-planting. In New England, and all the Atlantic States, there are large areas of barrens, worthless for field crops, that may be profitably devoted to wood growing. Our Atlantic sand plains that were once covered with woods can be reforested. Over 10,000 acres on Cape Cod, which thirty years ago were barren sand plains, are now covered with planted forests. The 200 acres of forest at Wood's Holl, of

Mr. J. S. Fay, and the 300 acres of planted trees of Mr. H. G. Russell at East Greenwood, R.I., are genuine object lessons for New England. On almost every farm there are waste places where trees might be earning dollars for their owners, growing by the brook or river, or on hillsides, or overhanging cliffs too steep for cultivation.

Arbor Day has proved as memorable for the home as for the school, leading youth to share in dooryard adornments and in planting trees by the wayside. Much as has been done on limited school grounds, still greater improvements have been made on the homesteads and the roadsides.

UTILISING POOR FARMING LAND.

There are two facts which must strike every observer of modern economic tendencies as showing the absolute necessity from the farmer's standpoint of individual self-preservation of tree planting and forest preservation. The one is the growing cheapness and abundance of ordinary farm produce, the other the increasing scarcity and dearness of the more valuable kind of timber. Ordinary foresight, such as any man in business is obliged to exercise day by day to save himself from ruin by observing the tendencies of the age and taking note of changed conditions, should have long since called a halt in the process of forest destruction and induced farmers to plant trees extensively as the best possible investment for the future.

Unfortunately many men are slow to recognise that the world moves. They look at things through the spectacles of their grandfathers and travel through life along the old ruts in which they were born. Their grandfathers cut down every tree in sight and planted wheat, because trees were plentiful and wheat scarce. They continue chopping down trees and sowing wheat, although in the interval an agricultural revolution has taken place. Timber is now scarce and wheat plentiful, but it makes no difference to them. They go on just the same as if the conditions of fifty years ago were those of to-day, notwithstanding that with the opening up of the prairie regions of this continent and other continents by steam communication, cereals are continually becoming cheaper. They continue the unequal struggle against the virgin fertility of the Western prairies, and the coolie labor of the East, growing wheat or other cereals on poor worn-out land better adapted for forestry, and neglecting altogether the opportunity offered of growing timber to provide for the needs of the future. It is no wonder that a business conducted with so little foresight or reference to the law of supply and demand often proves a failure. Were farms managed with an ordinary measure of business foresight instead of in the happy-go-lucky fashion which sees no farther than the next harvest-time; and the owners men capable of grasping the economic situation, and realising the import of the changes in agricultural conditions taking place around them, they might have easily averted loss and added to the productiveness and value of their land by husbanding their timber resources.

The problem of what to do with the abandoned farms of which so much has been heard lately is in a fair way of settlement. These farms have been abandoned, and many more are on the way to abandonment simply because they could not profitably compete in growing ordinary farm produce with the newer and more fertile regions opened up in the west. If partly planted with trees they would again become profitable. The fertility of the richer and more fertile portions would be improved, and the plantations growing in value year by year would eventually become a permanent source of profit. This is exactly what is being done in some of the Eastern States where there are large areas of land once under tillage lying idle. In *Garden and Forest* there appears an instructive description of an estate in North Beverly, Mass., which deserves the careful attention of all interested in rural economy, because it emphasises the fundamental principle underlying all successful agriculture—the adaptation of the crop to the character of the soil.

"The estate which stretches along the western shore of Lake Wenham, a beautiful sheet of fresh water, consists of 275 acres, and was bought in 1875 by the late John C. Phillips, of Boston. The purchase comprised a number of farms or parts of farms and various small parcels of land; only a part of it perhaps forty acres in all being adapted to tillage. A hundred acres of upland and swamp were covered with a natural growth of hardwood, pines and soft maples, the remainder of the estate being overlaid by dry glacial drift, clothed with scanty herbage and occasional clumps of stunted blackberry bushes. Early attempts at cultivating this land had exhausted whatever fertility it had ever possessed, and the free range of cattle over it for generations had prevented trees from springing up to cover its naked surface and replace the forests of pine which should never have been cleared from it.

The dwelling-house was placed by Mr. Olmsted, who was asked to prepare a scheme for laying out the estate, on rough stone terrace built to receive it on the steep bank of the lake, and the drives as they appear on the plan were constructed under his directions. The beauty of the situation and the charm of the native woods on the sides of the old moraine in the north-eastern part of the estate had been the prime motive which induced Mr. Phillips to choose this particular site for his country home, but this once determined on it became necessary to develop some scheme for the economical treatment of the large area of poor land which could not be tilled except with large annual expenditures of money, and which could never be made into satisfactory and productive farming-land It was evident that if the agricultural efforts of the owner could be confined to the good land that better results could be obtained than could possibly follow any effort to convert a larger part of the estate into a farm, and under Mr. Olmsted's advise this view was adopted. A tract of low, wet, rich soil, about forty acres in extent, in the north-west corner of the estate, and just north of the barns as they are now located, was thoroughly drained and made one of the best and most productive fields in Massachussets. It remained to determine the destination of such portions of the remainder of the estate as were not already covered with trees. It was soon apparent that there was but one course to follow, and that was to cover it as rapidly as possible with such varieties of trees as grow naturally on poor soil, and so avoid the expense of annual tillage or the annual harvesting of unprofitable crops of scanty grass.

Mr. Olmsted's idea was to convert the whole estate, with the exception of the arable land in the north-west, into a more or less open forest, in the midst of which the manor-house should stand like a forest-lodge in an oasis of kept grounds confined to its immediate neighborhood and encircled by the boundaries of the terrace; and although this plan has not yet entirely been carried out, all the operations of late years have been made with the idea of gradually extending the plantations over the whole of the dry uplands. The first plantation was made in 1880, and the area now planted is about seventy-five acres. A number of varieties of trees were tried, principally European larch, the Scotch pine, the Austrian pine, the Norway spruce, the white pine, the Douglas fir and the canoe birch, but of late years white pines have been used almost exclusively, about sixty thousand having been planted since 1883. The larch has grown very rapidly, making trunks a foot in diameter in twelve years, and are as thrifty and as promising of long life on the shores of Lake Wenham as the larch on Mr. Henry G. Russell's estate, described last year by one of our correspondents; they are not as tall, however, as the canoe birches, which have grown on this soil with remarkable vigor, indicating the value of this tree, one of the best timber trees of our northern forests to plant on light gravelly soil. The Douglas spruce has grown rapidly, too, and vigorously, and there is every indication that it will reach a large size on this soil. The Colorado variety of this noble tree, which is certainly one of the most promising of all exotic conifers introduced into the north Atlantic states, can be seen in greater numbers on the Philips estate than anywhere else, different individuals displaying a remarkable diversity of habit and a great variety of shades of color. White pines increase in height from one to four feet every year; and the appearance of the young plantations indicates that, for covering the sterile hills of New England in spite of insects which attack and often deface it, this is the safest and the most profitable tree to plant.

We feel that an estate like this, managed intelligently on a system conceived and developed with the view to the best permanent economic results is an object-lesson of real public importance; any well-planned and prudently conducted experiment which directs public attention to the possibility and advantage of using lands not otherwise valuable in a way to to secure a fair profit to their owner helps to establish and enlarge the prosperity of the state.

THE VALUE OF WINDBREAKS.

Wherever winds have a destructive sweep there is a lack of those provisions that nature would supply if let alone. Run an old-fashioned fence across a lot, and in ten years it would be the centre of a row of young trees, forming a solid windbreak. On knolls hereabout, if barred from cattle, hemlock and pines start. Fifty years ago I dragged rails to enclose a bit of land, which, to my boyish eye, was a delightful spot, where some tiny evergreens were trying to get a start on ridges and slopes and knolls. I was not interfered with, and so the cows were shut out. The result is now a thing of beauty. But that is not all; the winds that used to leap off the hill-top down on our orchards and barns are now decidedly broken. The only conifer native to our hills is the hemlock, and its beauty is hardly equalled. But the arbor-vitæ—readily takes to our soil, and I have used that for my hedges. Under the lee of these the sharp winds never are felt, and the effect is largely to restore climatic conditions that existed before the forests were so extensively cut away. Quinces, for example, bear once more as they did fifty years ago.

On one side of the street here fruit abounds that cannot be grown across the way. I have no trouble with Diana, Isabella and Iowa grapes, while even Concords do not get a fully ripe flavor a few hundred rods away. This is, to be sure, owing partly to the contour of the land, but it is also due largely to the additional protection given. The advantages are not only general, but special and local; we cannot only affect climate on a large scale by forests and by our plantations of screens and windbreaks, but we can make our own lawn or orchard climate.

Where land is abundant a belt of evergreens may be set. I have in mind one large orchard in this town, about one-third of which is sheltered in this way, and is in perfect health; two-thirds are exposed to the sweep of the north-west winds, and the trees are of no use except for fuel. The line of demarcation is plain to every one who drives by, and the contrast is almost startling. The effect on annual crops may not be so apparent, but it is logically sure. I am confident that one of the first duties of a purchaser of land is to study its exposure and plant screens against the most trying winds. While we are waiting for the Government to solve the forestry problem, we can in a small way control our own local climates to advantage.—*E. P. Powell.*

SIR WALTER SCOTT ON TREE PLANTING.

Sir Walter Scott, as is well known, was an enthusiast on the subject of tree planting, and expended large amounts in beautifying the landscape of his Abbotsford estate by laying out extensive plantations in which he took a great deal of justifiable pride. He had a thorough practical knowledge of forestry, such as was equalled by few men of his time. Sir Walter contributed a valuable paper on the subject to the *Quarterly Review* in 1827, which though having in view the planting of large estates in the Highlands under very different social and climatic conditions to those which prevail in Canada, nevertheless contains many ideas and recommendations which are applicable here with some modifications.

The same misapprehension of the objects and aims of forestry and unreasoning opposition to increasing the wooded area so often encountered in this country prevailed at the time Sir Walter wrote. On this point he says :

" To speak the truth, agriculture, as Mr. Shandy says of the noble science of defence, has its weak points. Those who pursue one branch of the art are apt to become bigoted and prejudiced against everything which belongs to another, though no less essential, department. The arable cultivator, for example, has a sort of pleasure in rooting up the most valuable grass land, even where the slightest reflection might assure him that it would be more profitable to reserve it for pasture. The store farmer and shepherd, in the same manner, used formerly to consider every spot occupied by a tree as depriving the flock of a certain quantity of food, and not only nourished malice against the woodland, but practically labored for its destruction ; and to such lamentable prejudices on the part of farmers and even of proprietors is the final disappearance of the natural forests of the north chiefly to be attributed. The neglect of enclosure on the side of the landlord ; the permitted, if not the authorised invasions of the farmer ; the wilful introduction of sheep and cattle into the ground where old trees formerly stood, have been the slow but effectual, causes of the denuded state of extensive districts, which in their time were tracts of what the popular poetry of the country called by the affectionate epithet of 'the good green wood.' Still, however, the fact of such forests having existed, ought now, in more enlightened times, to give courage to the proprietor, and stimulate him in his efforts to restore the sylvan scenes which ignorance, prejudice, indolence and barbarism combined to destroy."

The selection of suitable localities for tree-planting is a point of great import—and one too often overlooked. The observations of Sir Walter Scott upon this head are universally applicable and emphasise the necessity of being guided by the natural conformation of the ground. His advice as to the situation of timbered land is of course equally valuable when the question is as to what portions of a new farm should be cleared and what allowed to remain in bush. If it were generally followed, both in clearing and replanting, leaving the wood lots to occupy the rising ground regardless of lines of mathematical precision, our farms would not only present a more picturesque appearance, but would be materially enhanced in value by the better protection afforded the crops :

" The improver ought to be governed by the natural features of the ground in choosing the shape of his plantations as well as selecting the species of ground to be planted. A surface of ground undulating into eminences and hollows, forms to a person who delights in such a task, perhaps the most agreeable subject of consideration on which the mind of the improver can be engaged. He must take care in this case to avoid the fatal yet frequent error of adopting the boundaries of his plantation from the surveyor's plan of the estate, not from the ground itself. He must recollect that the former is a flat surface, conveying, after the draughtsman has done his best, but a very imperfect idea of the actual face of the country, and can therefore guide him but imperfectly in selecting the ground proper for his purpose.

" Having, therefore, made himself personally acquainted with the localities of the estate, he will find no difficulty in adopting a general principle for lining out his worst land. To plant the eminences, and thereby enclose the hollows for cultivation, is what all parties will agree upon ; the mere farmer, because, in the general case the rule will assign to cultivation the best ground, and to woodland that which is most sterile ; and also because a wood place on an eminence affords, of course, a more complete protection to the neighboring fields than if it stood upon a level with them. The forester will give his ready consent, because wood nowhere luxuriates so freely as on the slope of a hill. The man of taste will be equally desirous that the boundaries of his plantation should follow the lines designed by nature, which are always easy and undulating, or bold, prominent and elevated, but never either stiff or formal. In this manner, the future woods will advance and recede from the eye, according to and along with the sweep of the hills and banks which support them, thus occupying precisely the place in the landscape where nature's own hand would have planted them. The projector will rejoice the more in this allocation, that in many instances it will enable him to conceal the boundaries of his

plantations, an object which, in point of taste, is almost always desirable. In short the only persons who will suffer by the adoption of this system will be the admirers of mathematical regularity, who deem it essential that the mattock and spade be under the peremptory dominion of the scale and compass; who demand that all enclosures shall be of the same shape and of the same extent; who delight in straight lines and sharp angles, and desire that their woods and fields be laid out with the same exact correspondence to each other as when they were first delineated upon paper."

The writer quotes a noteworthy instance which fell under his observation as affording a practical test of the profitableness of the mode of planting which he advocates.

"A gentleman of our acquaintance had, some years ago, the purpose of planting a considerable part of a farm of about one hundred and twenty acres, which lay near his residence. It rented at about twenty shillings per acre. The proprietor, rejecting a plan which was offered to him for laying off the ground into fields resembling parallelograms, divided like a chess-board by thin stripes of plantation, went to work in the way we have mentioned above, scooping out the lowest part of the land for enclosures, and planting the wood round it in masses, which were enlarged or contracted, as the natural lying of the ground seemed to dictate, and producing a series of agreeable effects to the eye, varying in every point of view, and affording new details of the landscape, as the plantations became blended together or receded from each other. About five or six years after this transformation had been effected, the landlord met his former tenant, a judicious, cool-headed countryman, upon the ground, and naturally said to him, 'I suppose, Mr. R., you will say I have ruined your farm by laying half of it into woodland!' 'I should have expected it, sir,' answered Mr. R., 'if you had told me beforehand what you were about to do; but I am now of a very different opinion; and as I am looking for land at present, if you incline to take for the remaining sixty acres the same rent which I formerly gave for a hundred and twenty, I will give you an offer to that amount. I consider the benefit of the enclosing, and the complete shelter afforded to the fields, as an advantage which fairly counterbalances the loss of one-half of the land.' The proprietor then showed Mr. R. the plan which had been suggested to him, of sub-dividing the whole farm by straight rectilinear stripes occupying altogether about five and twenty or thirty acres. The intelligent and unprejudiced agriculturist owned that, *a priori*, he would have preferred a system which left so much more land for the occupation of the plow, but as frankly owned that the trees could neither have made half the progress, or have afforded half the shelter, which had actually been the case under the present plan, and that he was now convinced that the proprietor had chosen the better part."

The need of enclosure as a means of protecting the plantation from animals is fully dwelt upon, but as the author's recommendations in this matter refer almost entirely to local conditions, they need not be reproduced here. His observations with regard to drainage are more applicable to Canada:

"A preparation no less necessary than that of enclosing and now generally attended to, although often far too superficially performed, is the drainage of such parts of the intended plantation as are disposed to be marshy. Water, which, when pure, is the necessary nutriment of all vegetables, becomes, when putrid or stagnant, their most decided enemy. There exist no trees, however fond of subaqueous soil, which will thrive if planted in an undrained bog. On the other hand, there is scarcely any ground so swampy that, provided it affords a level for draining, may not be made to bear trees, if the kinds are well chosen. We have seen the spruce, silver fir, and even the balm of Gilead pine, attain great magnitude in a soil so moist that the trees were originally planted in what are called *lazy beds*. It must be, of course, essential that the drains should be kept open, and scoured from time to time, but it will be found that, as the trees advance, their own demand for nourishment will exhaust a great deal of the superfluous moisture; for as the fall of a natural forest in a wild country usually creates a morass, so the growth of a wood, when the first obstacles are removed, has a tendency to diminish a bog which has been already formed."

The necessity of care in planting cannot be too strongly enforced. Farmers and others are often disappointed with the results of setting out trees owing to the death or stunted growth of their plantations, and discouraged from making further improvements of the kind, when the trouble arises entirely from their own carelessness or inexperience. On this important point Sir Walter says:

"And here we may hazard an observation, that, of all accidents detrimental to a plantation, those which arise from the slovenly haste of the workman are most generally prejudicial. Sometimes grounds are planted by contract, which, for obvious reasons leads to hasty proceedings, but even where the proprietor's own people are employed, which must be usually the case in undertaking in a distant and wild country, the laborers get impatient, and if not checked and restrained, will be found to perform their task with far more haste than good speed. The experienced woodman will guard with peculiar care against this great danger; for a tree well planted will be found to grow in the most unfavorable spot, while plants, the roots of which have been compressed, or, perhaps, left partially uncovered, will decay even in the best soil and the most sheltered situation."

In regard to pruning, an operation which so far as forest trees are concerned is much more general in Britain than in Canada, the most pertinent of the writer's suggestions is that it should be done at an early stage of growth. He characterises it as a great blunder to postpone pruning until the use of an axe is necessary when the injury inflicted on the tree will be much greater than if the operation had been done with the knife.

Sir Walter Scott's admirable paper concludes with the following general observations on the subject which present in comparatively brief compass such a clear and comprehensive view of the benefits of forestry from a broad national and economic standpoint, and answer so aptly and conclusively the short-sighted and selfish objections often raised that it may fittingly find a place here.

"Indeed, it has always seemed to us not the least important branch of this great national subject, that the increase and the proper management of our forests cannot but be attended with the most beneficial effect on the population of the country. Where there lies stretched a wild tract of land, affording scanty food for unsheltered flocks, the country will soon, under a judicious system, show the scene most delightful to the eye—an intermixture of pastoral and sylvan scenery, where Ceres without usurping the land, finds also spots fit for cultivation. For even the plow has its office in this species of improvement. In numerous places we are surprised to see the marks of the furrows upon plains, upon bleak hillsides and in wild moorland. We are not to suppose that in the infancy of agriculture, our ancestors were able to raise crops of corn where we see only heath and fern. But in former times, and while the hills retained their natural clothing of wood, such spots were sheltered by the adjacent trees, and were thus rendered capable of producing crops. There can be no doubt that the protection being restored, the power of production would again return, and that in the neighborhood of the little hamlets required for the occupation of the foresters, the means of his simple subsistence would be again produced. The effects of human industry would, as usual, overbalance every disadvantageous consideration, and man would raise food for himself and his domestic animals in the region where his daily labor gained his daily bread.

"There would thus arise in the wild desert a hardy and moral population, living by the axe and mattock, pursuing their useful occupation in a mode equally favorable to health and to morality. The woods, requiring in succession planting, pruning, thinning, felling and barking, would furnish to such laborers a constant source of employment. They would be naturally attached to the soil on which they dwelt, and the proprietor who afforded them the means of life would be very undeserving if he had not his share of that attachment. In a word the melancholy maxim of the poet would be confuted, and the race of bold peasantry whom want and devastation had driven from these vast wilds would be restored to their native country. This circumstance alone deserves the most profound attention from every class of proprietors, whether the philosophical economist, who looks with anxiety for the mode of occupying and supporting an excess of popula-

tion, or the juvenile sportsman who seeks the mode of multiplying his game, and increasing the number of his *gardes de chasse*. The woods which he plants will serve the first purpose, and, kindly treated, his band of foresters will assist in protecting them.

"We may be thought to have labored too long to prove propositions which no one can reasonably dispute; yet, so incalculably important is the object, so comparatively indifferent is the attention of proprietors, that it becomes a duty to the country to omit no opportunity of recurring to the subject.

"The only decent pretext which we hear alleged for resisting a call which is sounded from every quarter, is the selfish excuse that the profits of plantation make a tardy and distant return. To a person who argues in this manner it is in vain to speak of the future welfare of the country, or of the immediate benefit to the poorer inhabitants, or of the honor justly attached to the memory ef an extensive improver, since he must be insensible even to the benefit which his own family must derive from the improvement recommended; we can, notwithstanding, meet him on his own ground, and affirm that the advantage to the proprietor who has planted a hundred acres begins at the very commencement of the undertaking, and may be realised whenever it is the pleasure of the proprietor that such a realisation shall take place. If, for example, he chooses to sell a plantation at five years old, or at an earlier period, there is little doubt that it will be accounted worth the sum which the plantation cost him in addition to the value of the land, and also the interest upon the expense so laid out. After this period the value increases in a compound ratio; and at any period when the planter chooses to sell his property, he must and will derive an advantage from his plantation, corresponding to their state of advancement. It is true that the landed proprietor's own interest will teach him not to be eager in realising the profits of his plantations, because every year that he retains them adds rapidly to their value. But still the value exists as much as that of the plate in his strong-box and can be converted as easily into money, should he be disposed to sell the plantations which he has formed.

"All this is demonstrable even to the prejudices of avarice itself in its blindest mood; but the indifference to this great rural improvement arises, we have reason to believe, not so much out of the actual lucre of gain as the fatal *vis inertiæ*—that indolence which induces the lords of the soil to be satisfied with what they can obtain from it by immediate rent rather than encounter the expense and trouble of attempting the modes of amelioration which require immediate expense—and what is, perhaps, more grudged by the first-born of Egypt—a little future attention. To such we can only say that improvement by plantation is at once the easiest, the cheapest, and the least precarious mode of increasing the immediate value as well as the future income of their estates, and that therefore it is we exhort them to take to heart the exhortation of the dying Scotch laird to his son: 'Be aye sticking in a tree, Jock; it will be growing whilst you are sleeping.'"

WHAT IS FORESTRY.

A valuable addition to the literature of forestry has been made during the year by the issue of a brochure by Prof. B. E. Fernow, chief of the Forestry Division of the United States Department of Agriculture, being Bulletin No. 5 of its publications, entitled "What is Forestry?" The circulation of this work ought to do a good deal to clear away popular misconceptions as to the scope and purpose of the efforts being put forth by nearly every civilised government to prevent the destruction of the forests and the consequent impoverishment and depopulation of the country. Prof. Fernow, to show the importance of the question in its bearing upon the timber supply of the future, gives some interesting statistics as to the value of the forest productions of the United States. The total annual product of wood material of all descriptions consumed in that country may be valued in round numbers at $1,000,000,000 representing roughly speaking 25,000,000,000 cubic feet of wood, or the annual increase of the wood growth of 500,000,000 acres of forest in fair condition. Its value exceeds ten times that of the gold

and silver output, and three times the annual product of the mineral and coal mines put together. It is three times the value of the wheat crop, and exceeds the gross income of all the railroad and transportation companies. The capital employed in milling, aside from that invested in cutting timber is estimated at $650,000,000 and the direct manufacture of forest and saw mill products affords employment to upwards of 300,000 people irrespective of those engaged in its transportation and re-manufacture.

It is only comparatively lately that in addition to the obvious and direct value of the forest as the source of production of material which is so indispensible to our needs its value in promoting fertility, regulating climatic conditions, and equalising the supply of water has been fully established. It is to be regretted that a fact so vital to the future prosperity of the country has not even yet secured that general recognition which is essential in order to secure prompt and effective public action upon a comprehensive scale. The transition from the conditions of early settlement when every tree was regarded as a cumberer of the soil and a nuisance to be got rid of with as little delay as possible, to those which prevails to-day, has been too abrupt to allow the present generation to realise fully the need of forest preservatton. And considerations of immediate profit to be made by the destruction of the remaining woodlands too often blind the individual land owner to the duty which he owes to the country and to posterity, doing his share by forest preservation or replanting, to avert those calamities which have invariably followed close upon wholesale deforestation.

As Prof. Fernow forcibly points out, many people have an entirely wrong impression as to the object of forestry. It is not contemplated to interfere with useful and necessary production, or prevent entirely the cutting of timber in the regions under forest management. On the contrary, the forest is treated as the source of a perennial crop, to be judiciously harvested to the best advantage, taking care to utilise the land to its fullest capacity for the growing of timber. It is not the cutting of timber that the forester opposes, but its destruction in such quantities and in so reckless a manner as to destroy or retard the prospects of future production, and leave the earth bare of its natural covering in those places where a wooded growth is essential to the maintenance of desirable agricultural conditions. So far as the settled portion of Ontario is concerned, the mischief has already been done, and large areas which ought to have been permanently maintained as forest-land, yielding their yearly supply of wood by the culling out of the mature trees, have been entirely denuded by axe and fire. The urgent question, therefore, as regards these districts is that of restoring the equilibrium by reforestation. We cannot do better than quote from Prof. Fernow's work the following instructive passage on forest reproduction.

Reproduction.

There are three ways of reproducing a forest, which lead to three methods of management. We may either remove the original growth and replant the area, or we may cut it and expect the reproduction by sprouts from the stumps, or else we may so manage our cutting that seed from some remaining trees sows itself and produces a new growth of seedlings. Often any two or all three methods of reproduction may be employed together.

The first method, namely, that of replanting the cleared ground, is simple but expensive, especially in our country, where wages are high.

The method is objectionable, also, because by the removal of the original cover the soil is exposed to sun and wind, and is liable to be covered by weed growth, which reduces the chances of successful reforestation. It is, however, largely used in the pine forests of Europe with tolerable success, and has the advantage that the cutting may be done without regard to the seed production.

Planting becomes necessary where all original growth is absent, as in the prairies and plains, and on the devastated hill and mountain lands, or where, by lack of proper attention in cutting the forest, undesirable species have gained possession of the ground.

The second method, that of reproduction by sprouts from the stump, familiarly known

as coppice management, can be used only, of course, with such kinds as will sprout. The conifers, therefore, are entirely excluded, for although a few of them (sequoia, and some pines) do sprout, the sprouts do not develop into trees of size. Altogether, sprouts, while growing rapidly, remain comparatively short. This management is, therefore, only fit for the production of firewood, charcoal, ties, poles, posts, and wood of small dimensions. Most of the so-called second growth of the forests of New England and elsewhere in the United States consists of coppice growth, and does not promise much for future supplies of dimension timber. In time the stocks lose their vitality, and the quality of the forest deteriorates.

The third method, that of natural reproduction by seed, together with artificial planting, produces the timber forest.

There are various ways of applying this method; either leaving seed trees scattered over the entire area, or clearing strips and leaving a neighboring growth of seed trees to supply the seed for the reproduction on the cleared strip.

In these methods one is dependent on the seed-bearing of the mother trees, and it must not be overlooked that most, or many of our most valuable trees do not bear seed every year, at least not plentifully.

The clearing of strips, with seeding from the neighboring growth, is perhaps the simplest, and on that account may recommend itself to the lumbermen. It is applicable with success, however, only to those kinds which have light enough seed to be scattered over the cleared strip by the winds, and which can sprout and develop satisfactorily without the partial shade of nurse trees, and grow fast enough not to be crowded out by weeds.

To make this method tolerably effective, the width of the cleared strip should not be more than the distance which the wind is sure to carry the seed, say from two to four tree-lengths, according to kind, and that the clearing occur in or precede a seed year.

By reducing the size of the clearings to small openings the chances of successful reproduction are increased; and in this manner we come to the next method, which consists in a thinning out through the entire area that is to be reproduced, and letting in enough light to stimulate seed bearing, proper decomposition of the litter to make a seed bed, and to favor the growth of seedlings. The method of reproduction from seed trees standing on the same ground requires perhaps the least change from our present method of utilising the forest, which consists in culling out trees here and there. The main changes necessary would be to remove first the undesirable trees and the undesirable species, and to utilise the desirable only gradually after seeding has taken place, and in doing so keep in view the requirements of the young growth for either shade or more light. To do this successfully requires considerable knowledge and judgment, and in fact the art of the forester is here called into fullest requisition. Differences of condition necessitate differences of treatment. It would lead us too far to discuss in this paper at length what is required. I may only briefly recite an example, namely, how the beech forests are reproduced in Europe.

The beech, like many other timbers, bears seed only periodically. Seed years occur in different localities at periods varying from three to even twenty years, records of their occurrence being kept. A few years before the seed year is expected to occur the forest is somewhat thinned out to admit air and light upon the soil, in order that the litter of the forest floor be more rapidly decomposed and humified, and so may form a suitable seed-bed for the sprouting of the seed, and also to stimulate the mother trees to a plentiful production of superior seed. In this thinning the inferior material and the undesirable kinds are first removed, and such kinds as reproduce themselves easily without aid from the forester. When the nuts fall, pigs may be driven into the woods to plow them under. Under favorable conditions a soft, green carpet of young beech seedlings will be found to cover the ground in the spring next after the seed year. Now comes the critical period. If the mother trees were left, the whole crop would be lost, and while waiting for the next seed crop, under the altered light conditions which invite grasses, weeds and other species, the difficulties in securing reproduction are increased. By thinning out gradually the proper amount of light is given to the young crop, and when in three or four years

the last of the mother or nurse trees are removed, a thicket of young beeches has replaced the old growth. In a similar manner, with necessary modifications in procedure according to species, climate and soil, the natural reproduction of other species is effected.

It is almost invariably the case that when a plantation has been, as indeed it should be, planted too thickly at first, the subsequent thinning is neglected, often from negligence, but frequently because the owner is really not aware of the proper manner in which to proceed. Presently a time comes when to thin it effectively the branches of the trees cut down will, in being drawn to the earth, tear to pieces those intended to be left standing, and in dragging them to the outside of the wood they injure the bark of the others. A chapter on this subject, which we quote from the report under consideration, will be found valuable.

Special Considerations in Thinning.

The three questions in thinning which always confront the forest manager are: When to begin and how often to repeat the thinnings; how severely to thin at one time, or how many trees to permit to grow; which trees to take out.

These questions, of course, can only be answered according to the special conditions of each case. As a rule, it will be best to begin this series of thinnings when the signs of the struggle for light begin to show themselves unmistakably; that is to say, when a decided difference in individual development can be seen and the dominant growth be discerned from the laggards.

On strong soils and with light-needing species this occurs sooner, and the time for interference is more easily determined; but in these cases assistance is also less urgent than on poorer soils, where more individuals are struggling in an even fight, and usually the separation into dominant growth and suppressed or laggards does not take place easily and early, and here, therefore, it is more needful to give timely assistance.

In practice, a consideration for beginning these thinnings is also the possibility of using or marketing the material cut out. But this is a proper consideration only because we do not know yet when it is profitable to spend time or money for thinning merely for the benefit of the remaining growth.

As a rule, the thinnings are begun in light-foliaged, rapid-growing trees with the fifteenth to twenty-fifth year, while with shade-enduring species one may wait until the twenty-fifth to thirtieth year; that is, the time when the greatest annual height growth is attained and diameter development is desirable.

The questions how much to cut out and how soon to repeat the operation are somewhat interdependent.

In small wood lots, where the owner uses perhaps the thinned out material himself, a continuous gradual thinning is best, while on large areas it may not be practicable to do otherwise than to subject a larger area to the operation at once, and repeat it in a few years. In such a case enough must be taken out to avoid crowding until a second thinning, and yet not to cut so severely as to interrupt the crown cover too long and lay bare the soil.

The oftener the thinnings are repeated the better for the remaining growth. The repetition may be made every two or three years in pines and rapid-growing soft woods, while in shade-enduring and slow growers every five years may be sufficient. Condition of the growth and judgment alone can determine this. The same is true as regards the amount to be thinned out.

I repeat that there are always three considerations to be kept in view, and their requirements balanced, namely, conservation or improvement of favorable soil conditions, which requires dense shading, while large yield in quantity requires room and loose position, and trunk development in quality requires moderate crowding.

A study of crown development is necessary to form a judgment as to what is required. Here we have the predominant few, with an exceptionally full crown, while

the majority of the trees have only a moderately developed head. We next discern quite a number which have still a normally developed crown, yet form only a subordinate part in the main crown canopy. These three classes form the dominant growth and the active crown cover. Underneath these we find trees with small undeveloped crowns, suppressed, dying, dead. These last classes are, to be sure, out of the struggle, and their removal means nothing to the superior or dominant growth; they may be taken or left as their wood can be made useful or not. The question can only be which of the other three classes to favor and how much to open the crown canopy.

As to the latter question, soil conditions are to be consulted first. On poorer soils less opening is preferable; the same rule is good on steep hills, southern exposures, and where windfalls may be invited by too severe thinning. The age of the growth also has a bearing. Later on, when the principal height growth has been attained and the trunks are clear of branches to a sufficient height, and the formation of clean boles is not any more to be considered, the thinnings may be made severer. As a rule the crown cover should not be interrupted more than the remaining growth is capable of closing up again within three to five years; this would take rarely more than one-fifth to one-third of the growth if the crown cover was normal at the time of thinning. As to which class to favor and which to remove opinions are at variance just now. The old conservative school permitted the removal of the first or second class only, when either a more valuable kind was threatened to be overgrown and killed out by a less valuable, or when the latter had an abnormally spreading crown, overpowering more neighbors than it could possibly supplant in amount and quality of growth, or when malformed or diseased, or else when a growth showed too large a number of individuals developed equally, in which case the natural differentiation into dominant and overgrown takes too long a time to be accomplished naturally.

The new, more radical school argues that when the time for severer thinning has arrived, the foremost trees should be utilised first, because they yield the most valuable material and the next two classes are thus given opportunity to develop still into superior material, which they will do under the increased light influence, and that with more profit than if the stoutest trees had been given further advantages.

In the opinion of the writer this question cannot be decided for all cases alike, but species, age, and soil conditions may require one or the other principle to prevail.

In mixed growths it should especially not be overlooked that the light-needing species (like ash, oak, pine, larch) must have much more light than the shade-enduring (like maple, beech, spruce, hemlock) in order to develop at all satisfactorily.

It may be of interest here to state that through the means of thinnings the product per acre in the same time may be increased from three to five times of what the result would be were the forest left to itself.

One of the first things that the farmer, or in fact most individuals, consider with relation to tree planting is "What will it pay?" The following chapter from Prof. Fernow's pamphlet will give some light on the question. It must be remembered, however, that tree-planting pays in another way. Some time ago when in the Highlands, the foresters of Athol pointed out to me that where they had planted trees, the worthless heather previously near by disappeared and valuable pasture took its place. In the Lowlands one of the leading men of the country said to me, "I plant trees not for the timber, I plant them because both my pasture-lands and my cornfields adjoining become more fertile and yield me a higher rent."

Profitableness of Forest Management.

The question whether forest management is profitable can no more be answered in general than the question whether agriculture or any other business is profitable. It depends upon many conditions which differ in each case.

Broadly speaking, when we consider that the forests occupy or ought to occupy ground that is not good for anything else, that after being started it grows without in-

volving work, except such as yields valuable material, it will be conceded that the small exertion necessary to prevent the soil from being laid waste or occupied by inferior brush must be well repaid.

There are examples enough to be found in the United States where even forest planting in a small way has proved profitable; forest management on a large scale does not as yet exist.

To show what the financial results of management on a large scale are abroad, it may be of interest to add a few illustrative statistics, and it will be especially noteworthy in these what wide differences in expenditures and results there are to be found over so small a territory. These differences are due to differences of market facilities and intensity of management and also to forest conditions.

Countries.	Forest area.	Total expenditure.	Revenue.		Expenditures per acre.						Net revenue per acre.
			Gross	Net	Total.	Per cent of gross income	Administration and protection.	Marketing crop.	Cultivation.	Roads.	
	Acres.	$	$	$	$		$	$	$	$	$
Prussia	6,000,000	8,000,000	14,000,000	6,000,000	1.33	58	0.48	0.30	0.14	0.06	0.96
Bavaria	2,300,000	3,150,000	5,880,000	2,730,000	1.37	53	.64	.37	.11	.11	1.19
Würtemburg	470,000	1,025,000	2,260,000	1,235,000	2.17	45	.87	.92	.22	.33	2.63
Saxony	416,000	1,040,000	2,750,000	1,710,500	2.50	37	.65	.81	.11	.21	4.11
Baden	235,000	404,000	1,090,000	686,000	1.54	40	.22	.83	.15	.12	2.90
City of Zurich	2,760	14,000	26,000	12,000	5.00	54	1.14	2.10	.16	1.14	4.40

In fourteen state forest administrations of Germany, covering 10,000,000 acres, the cut during 10 years was 55 solid cubic feet per acre per year, of which 27 per cent., or about 15 cubic feet, was lumberwood, equal to about 120 feet board measure.

Figured on such basis of 55 cubic feet of normal annual accretion and a rotation of 80 to 100 years, the total normal wood reserves on these state forest lands would be in round numbers 24,750,000,000 cubic feet, worth, at 5 cents per foot, the average stumpage value, $1,250,000,000. The net income from these lands averages $31,500,000, namely, $29,000,000 for wood and $2,5000,000 for other uses, or $3.15 per acre, or only 2½ per cent. on the value of the wood reserves figured at $125 per acre. From this it will be seen that a considerable amount of capital is tied up in the wood reserves and brings only a moderate income. On such a large area, to be sure, there are many parts that produce but little and which depress the general results, areas which are managed for cultural and economic reasons and for the protection of watersheds, but which do not produce such revenues as would tempt the majority of private men, and hence the more reason for state ownership of these.

That, however, it is more profitable than otherwise to the farmer to keep his woodlot in fair producing condition, and to the timber land owner to avoid all wasteful use of his property which prevents natural re-forestation, must be as patent as that a herd of cattle producing calves is more profitable than one which is barren.

FORESTRY IN INDIA.

Wherever forestry has had a fair trial its beneficial results as contrasted with the conditions prevailing in similarly situated countries or districts where no precautions have been taken to preserve the woodlands, are so marked as to force themselves on the

attention of every intelligent observer. In no country in the world perhaps are the advantages of the system in sharp antithesis to the destructive effects of forest destruction more obvious than in India, which has only been saved from the fate that has overtaken so many eastern countries once renowned for their fertility, but now barren and desolate wastes, by the wise and far-sighted action of her rulers in arresting the work of waste and spoliation. Under the government of sluggish and improvident despots, careless of the future and solicitous only to extort from their subjects the means for indulging the luxury and magnificence which have become proverbial, Persia, Syria, Central Asia, and the northern portion of Africa, once the garden spots of the world where nature rewarded the labors of the cultivator with lavish profusion, have long since lost their productiveness and become largely desolate and infertile regions incapable of supporting a tithe of their former populations. The decline of the eastern nations is almost wholly due to the destruction of the forests which once clothed their now sterile hillsides and barren sandy plains. Without stable and settled government, and subject to the constant vicissitudes and ravages of warfare, or the scarcely less harassing exactions of rapacious rulers, the people losing all concern for the future sacrificed to present convenience or profit the source of their national prosperity.

Precisely the same causes were at work in India until a comparatively recent date. The inroads upon the forests, owing to the natural apathy and carelessness begotten by centuries of oppression and misgovernment resulted in very considerably diminishing the fertility of extensive regions and causing numerous periods of scarcity and famine. At last the government of British India seriously alarmed by the climatic changes for the worse, and the decreased productiveness which inevitably resulted, took decided steps for the preservation of the forests as the only means of averting the calamities which have so conspicuously overtaken adjoining eastern countries. All travellers and officials in India who have devoted any attention to the subject testify as to the immense practical utility of the work already accomplished, and the magnitude of the peril from which Britain's largest dependency has been rescued by the government's timely action.

Sir Richard Temple, who held more than one responsible position in India at a time when special efforts to cope with the famine and avert similar catastrophes in future were being put forth, thus speaks of the condition of affairs in the Madras Presidency in 1877, in his well-known work "Men and Events of my Time in India":

"The wasteful destruction of trees, woods, or vegetation generally, and the necessity of forest conservancy being enforced more efficiently than before formed common topics of conversation among the most thoughtful and earnest of the Madras officers. The hill ranges in the interior of the country had been utterly denuded of vegetation and inroads were being made into the forests which still remained in some of the mountains. To these causes was in part attributed the disastrous irregularity of the seasons whereby the drouth in some months was succeeded by rainstorms and inundations in others. Observant men declared that in many places a sensible deterioration of the climate had resulted from the partial clearance of the forests. Again woods would sometimes be cut down which had retained or husbanded the moisture forming the supply of reservoirs for irrigation. Then the rain-water unrestrained would rush in superabundance to the reservoirs, silting them up or bursting their embankments; the water having thus exhausted itself would cease to flow, and thereafter the supply would fail. All this was duly represented to the Madras government and doubtless many remedial steps were taken. Still by reason of the treeless state of many districts and the diminution of forests generally there is danger lest the climatic conditions of southern India, including the greater part of the Madras Presidency and of Mysore, should undergo modifications productive of economic effects often adverse and occasionally disastrous. In respect to the prevention of drouth and its train of evils there is no subject more earnestly demanding the attention of government than the preservation of the forests."

Concerning his inspection of the Deccan in 1878, while he filled the position of Governor of Bombay, Sir Richard Temple writes:

"The marching along the hills afforded ample opportunity of studying the forests. Additional measures for preserving them were being adopted under the recently enacted

Forest Act with the zealous supervision of Mr. A. Shuttleworth, the conservator. Beyond the range of the Western Ghâts the Deccan was denuded of its vegetation as completely as the most treeless part of the Madras Presidency. Within the range, however, many forests happily remained and were being diligently conserved. The cattle-grazing which ordinarily proved injurious to the forest, was being restricted to particular 'blocks' or areas so that the vegetation might spring up in the remaining areas. Here were perceived all the ordinary reasons for preserving forests, the husbanding of the vegetation as a part of the national wealth, the permanent supply of the timber and fuel markets, the improvement of climatic conditions as affecting the regularity or irregularity of the periodical rains, the extension of moisture in a land where aridity prevails for several months in the year. In addition to these, however, there was a special reason in that from the mountains spring many rivers or streams which had been or were to be utilised for the storage of water in large quantities for irrigation. If the vegetation be preserved, the waters near the sources are retained to supply the canals; but if it be destroyed the waters become exhausted or evaporated and the canal must be left unsupplied. The destruction in the past, of some forests and the wasteful use of others, must be regretfully accepted as a proof that formerly neither the government nor its officers adequately appreciated the value of scientific forestry. The natives have been wholly blind to the subject and find difficulty in opening their eyes to it now."

The author goes on to point out that in regulating the access of the people to the forests and preventing unnecessary destruction the government of India labors under difficulties which seem to be of very similar character to those encountered in Canada and the United States. The natives, not satisfied with securing sufficient wood for agricultural or domestic uses, are anxious to exploit the forests for exportation and sale, and if they had their way the exhaustion of the timber supply would be merely a question of time. Human nature is curiously alike in all countries, and with the civilised Canadian as well as the dusky Hindoo, the consideration of a small but immediate and personal gain generally outweighs that of a great general advantage in the indefinite future. The principle of scientific forestry has seldom been better defined in few words than by Sir Richard. "The object" he observes, "is to treat the vegetation on the same principle as that which is applied to money by a financier who takes care of the capital and lives on the interest." The state forester is continually cutting and selling timber whereby the people really draw interest from the storehouse of national wealth without lessening their capital, whereas if the public were left to itself they would ravage the forests, wasting and destroying recklessly as well as consuming for their needs and in fact treating the national resources just as a reckless spendthrift does his money, in squandering his capital and so destroying the means of his future livelihood.

Managed with the distinct purpose of securing as large a revenue as possible while maintaining the standard of productiveness for the future, the forests of India now yield a cash revenue of two million dollars a year, in addition to the benefits they confer upon agriculture by preserving the fertility of the soil and conditions favorable to cultivation. According to the annual report of the Forest Department of the Madras Presidency for the official year, 1890-91 the total area of reserved forests and lands in the southern circle amounted to 8,701 square miles, being an increase of 360 square miles during the twelve months. The forest-administration has been compelled to exercise great vigilance in the prosecution of offenders in order to prevent injury to the forest and no fewer than 3,990 cases, principally for grazing cattle without permission and the unauthorised felling of timber were tried during the year. In eighty per cent. of the cases the accused persons were convicted. Much damage resulted from forest fires; in one instance an area of 2,700 acres being devastated. Referring to the condition of affairs which existed before the inauguration of the system of forest management the report says: "It is not too much to assert that the more valuable timbers—that is the teak and rosewood—were being exterminated in all the accessible forest areas in the southern districts—first for want of protection, and later on by heavy fellings of all mature trees, without any proper system of care for reproduction and insufficient protection." Large as the present revenue from the Madras forest is at present it is anticipated that it will be very considerably increased as the system is perfected and developed.

Edwin Arnold, the distinguished writer, who has always taken a deep interest in everything that concerns the welfare of India, in his book "India Re-visited," published in 1886, thus contrasts the State of Kattiawar, which yet remains under native rule, with the British provinces, and pays a deserved tribute to the wisdom of the policy of later years which has preserved to India the source of its greatness and natural wealth. Speaking of Kattiawar he says: "The soil hereabouts is full of nitrous salts which dry in a white crust wherever water has been deposited. Yet it is evidently very fertile and full of wells built with the sloping platform, where white bullocks draw the big skins of water up and then go backwards to plunge them in again to the monotonous song of the bylwallah. But Kattiawar wants trees. Trees will save India and are saving her from the fate of Central Asia, desiccated by the nakedness due to waste of wood. The forest conservancy promoted by the British Râj is one of its greatest benefits to the peninsula. India would have been a 'howling wilderness' if the sway of the Mogul or the Mahratta had lasted. It is her trees which hold the precious water in the earth and give shade, moisture, life. The peepul, the asoka, and the aswattha have never been half enough worshipped. Every forest officer is the priest of a true religion."

TREE PLANTING.

In former articles much has been said on this subject; but as it is well to keep the idea present in the reader's mind, a short synopsis of the best methods will be introduced here. In the first place, the soil should be put in as good condition as possible. It should be borne in mind, too, that while most varieties of trees will grow on nearly all the different kinds of soil, they will grow much better on a rich and fairly drained soil than on a poor or wet one.

Next, we must remember that the method of planting trees varies with their proposed location and purpose. If we are planting them at a distance, say of thirty feet, from one another, we shall have in time large independent trees, possessing many branches, some branching nearly to the ground. A line of such, at proper distances, makes an excellent windbreak, especially if evergreens are chosen for the purpose. But if we are planting for timber production, we should place our trees as closely as possible, so that for some years they will be striving to reach upwards above their fellows. This will tend to give long straight sticks, and should be encouraged by cutting off the lower branches, always remembering, in the case of evergreens, to do this while the branches are yet very small. This practice also tends to give clear timber, for every branch left makes a knot.

It will from this be observed that if, when planting windbreaks, we could make them of much greater depth than a single line of trees, we could grow a class of timber which the isolated line can never give us. This would be second-growth wood, and, of course, much more suitable for many farm purposes than that taken from the forest, as being of a much more tough and durable nature. Here we can grow the hickory, the ash, the elm and the cherry—all very valuable. If we plant black walnut, it is no doubt a valuable wood, but we must not expect it to produce wood fit for manufacturing purposes in much less than sixty years, while most others will be fit in half the time. I have seen large plantations of walnut at the age of forty years, which were then eighty feet high, and nearly two feet through at the ground. But the wood was not sufficiently mature for manufacture, and would not be, in the owner's opinion, till another twenty years had passed.

Yet this should by no means discourage walnut planting. The farm is more valuable, and will command a higher price, from the day the plantations are set out. It is as if we put money into a bank, to be drawn out when the farm is sold, or when, in after years, the timber is cut. There is this, also, to be said in favor of the walnut, that for many years before the trees are cut down, the crop of nuts should be of considerable commercial value. To effect this, however, in my opinion, it would be well to manure the sod around the trees. For the first eight years, indeed, the ground may be cropped,

preferably with a crop which needs hoeing and manuring. I have known the trees succeed well among Indian corn and potatoes.

Whatever be the kind of trees we are planting, there is one method of preparation of the soil which will very greatly promote growth, which is as follows: If the soil be of a hard or clayey nature, the addition of sand will greatly benefit it; nor are the benefits less observable when we add clay to a sandy field. It is well to procure these from the surface, as possessing more growing properties, yet deeper soil will answer, though not as well. The mixture of clay and sand assists greatly in bringing nourishment to the roots, and will be found to produce a much more reliable soil than either class of earth by itself. This has been verified by actual experiment on the lands of some of our most successful planters in western Canada. In Europe the mixing of earths has long been used as a method of increasing fertility, and it would, I think, owing to our different climate, and our shorter and hotter summers, be still more valuable here.

It would be well also, if, following the example of those in other countries, we should adopt the custom of planting the hill-sides, or some of the upper portion of farms, leaving the lower ground to agriculture. There are two reasons for this, first, that the higher land is generally a small proportion and the least cultivable, and next, that having the woods on a rising ground tends to give a regular supply of moisture to the rest of the farm. This has long been the method pursued elsewhere, and I have frequently observed instances in Canada which conclusively proved its value. What is most necessary to plant growth is a constant supply—not an overplus—of moisture to the land. Woods planted as above suggested assist in giving this, first by attracting showers, next, by storing in the forest bed, and gradually giving to the fields, the water which falls in heavy rains. The worst cases of "drying out" which ever occurred to me were where I had crops on upper ground, with no woods above them.

In planting evergreens there is one point to be noted, a wrong course in connection with which is the cause of many failures. These should be invariably kept moist, particularly the roots, from digging till planting. A deciduous tree will keep the sap alive for some time; but in the case of evergreens, the sap changes into a hard resinous substance, which destroys the life of the plant. Even the time while lying by the cavity prepared for planting them in is sometimes enough to kill them. The best way is, while they are being brought in the waggon, to keep them covered with some damp cloths. If the journey be long these should be re-wetted.

The question is frequently asked whether manure should be placed with the tree when being planted. Certainly raw manure should not be; it seems to burn the roots. Nevertheless, the richer the soil the better; but it should be rendered so by old manure, well mixed with the soil, so that no manure can be seen. In case of a plantation, the field should be well manured, and if possible summer-fallowed; then plant when the land is damp, either that fall or next spring. If we are planting a poor or rough piece of land, putting trees here and there, a cart-load or even a wheel-barrow load of earth well dug in at each place we plant, will be found of the greatest service. It is well always to dig wider than the roots spread, and to open these out. In the case of nursery roots, when healthy and with abundance of fibres, it is less necessary, as these are certain, with fair care, to prosper well.

The following extract from an official publication of some years back, well describes the situation:

It is surprising to see that, even with the bare facts staring them in the face, our farmers who are practically to-day the owners of the remaining timbered lands of the Province in all the settled districts, are in a condition of profound lethargy or innocent unconsciousness of the danger they invite or the losses they incur.

Still there is time even yet on many farms in not a few of the counties, for waste to be prevented, danger averted, and money saved, if men will only shake off the apathy they have hitherto exhibited, and see the true state of affairs in the light of self-interest, not to say self-preservation.

How little idea of providing against the continued depletion of the forests many of

them have, was well illustrated by an incident. The witness was a gentleman enjoying beyond most the confidence of his brother agriculturists—an admirable specimen of an intelligent and substantial yeoman. To the question, whether anything had been done in his district in the direction of replanting forest trees, he replied in an almost surprised manner :

"We do not think we have reached the miserable condition which requires us to face that difficulty yet. We have more bush than there is in many parts of the west."

But it happened that, just before, this same gentleman had told the Commissioners that his crop of fall wheat had been saved from winter killing—by what?—by the accidental shelter afforded it, not by his own, but by his neighbor's bush. But for this—the merest chance—one of the best farmers in Ontario, would not in all probability have had enough fall wheat to pay for the harvesting. And yet he almost scornfully repudiated the idea of planting trees.

Nor is this all. Not only have the farmers of Ontario destroyed property of fabulous value in the clearing process ; not only have they denuded their lands of necessary protection ; not only have they dried up their streams, and left dry ditches in many places to mark where once existed a valuable water-power ; but they have been, and still are going on very fast with the destruction of their supply of fuel. Instances have come within the observation of the Commissioners, where men who took up bush land thirty years ago have so thriftlessly managed their timber, that to-day, they have used the last stick and are actually buying cordwood.

Suggestions for Planting.

In enumerating the trees which I consider desirable for planting, I have named only those which could generally be obtained without any great difficulty or expense, in almost any part of Ontario, and I shall now give some data, which will show what growth these trees will attain within a specified time, taken from memoranda kept by myself which have come into my possession, and for the accuracy of which I am prepared to vouch :

"Elm trees taken from the woods as young trees of about six inches round the stem, and between eight and nine feet high, have attained in forty-five years, a height and girth round the stem at three feet from the bottom, in several instances as follows : One 60 feet high, 8 feet in circumference at 3 feet from the ground ; one 65 feet high, 8 feet 2 inches in circumference at 3 feet from the ground ; one 60 feet high, 7 feet 9 inches in circumference at 3 feet from the ground. Another elm planted about fifty years ago, a small tree from the nursery gardens, has now grown to a height of 70 feet, with a girth at 3 feet from the ground of 8 feet and 6 inches.

"A red oak, planted as a sapling about forty-eight years ago, is now nearly 50 feet high, and measures 5 feet 8 inches round the stem at 4 feet from the ground.

"A maple of the same age is 6 feet 5 inches round the stem, and is nearly 60 feet high, and two others planted within the same period, are 6 feet in girth at 4 feet from the ground, and between 50 and 55 feet high.

"All three of these were, when planted in their present position, young trees about 6 or 7 feet high—just the size at which they can be most safely transplanted when taken from the woods.

"Of beech I have no record that I can entirely depend upon, but I believe one that I measured, which gave nearly 4 feet as the girth at about the same height from the ground, and was about 38 feet high, has been planted over forty years.

"A butternut between forty-seven and forty-eight years old, measured six feet round the stem (four feet from the ground), and has attained a height of 75 feet.

"Of two ash trees planted fifty years ago, one is 60 feet high, with a girth of 5 feet 6 inches ; the other about 55 feet high, girth a little over 6 feet (3 feet from the ground.)

"It will be seen from this memorandum that the elm has made the most rapid growth of all these trees, and the maples come next ; although the ash is close upon them.

"Of evergreens (native) I can only give with certainty the white pine. Two of these—both planted fifty years ago—have reached, one a height of nearly 70 feet; the other a little over 60 feet. One measures 6 feet 6 inches; the other a little over 5 feet; at four feet from the ground.

"It will be seen, therefore, that, within an average of fifty years, trees transplanted at just such a size as they can be safely and conveniently taken up when growing in the woods (say from 5 to 6, 8 or 10 feet high), have attained dimensions which render them very valuable as firewood, as well as being perfectly sufficient for many useful purposes about a farm for which timber of a moderate size is suitable and requisite.

"I do not think that, with such facts as these, it can be said that there is anything visionary or impracticable in the means I have suggested for meeting the coming scarcity of timber in Ontario, and supplying the wants which will soon make themselves felt, even by the present generation of farmers, and will certainly press heavily upon their children, if not provided for in some way or other."

Construction of Shelter Belts.

For screens and shelter belts where evergreens are used, Mr. Leslie gives the follow-lowing advice:

"Trees for this purpose would not require to be of great height. If farmers consulted their own interest, I think they would commence by planting out small stock, say from 12 to 18 inches high. These trees grow very rapidly, say, on an average, three feet every year for the first five years, gradually lessening thereafter, and in a short time the farmer obtains a good shelter.

"As we get these trees (Norway spruce) from the old country, they are two years in the seed-bed and two years transplanted. That brings them from 12 to 15 inches in height and nicely rooted. When received in good condition, they are transplanted before being sold, and get a couple of years in this country, and are then removed. The tree is thus, in the latter case, six years old from the seed when planted for the purpose of shelter.

"All that we have ever sold have been raised in the old country (Scotland.) We find it much cheaper to import them than to raise them from the seed. Our climate is a little against raising evergreens from the seed; the sun is apt to scorch and kill them when in their early growth. In the moist climate of the old country they can be grown with much less care, and are raised and sold by millions.

"In planting a shelter bed, say an acre deep, the trees would not require to be placed closer than six feet apart; at that distance they would interlock in a few years. At six feet apart, about 1,200 trees per acre would be required, and they could be planted very cheaply by running furrows with the plow lengthwise and then across, placing the trees at the intersections of furrows. This would give the trees sufficient depth; in fact, I would rather earth up a little than plant too deep.

"I consider a good shelter belt can be made with evergreens two deep, placed say ten feet apart, with distance between the rows of five feet, and the trees placed so as to break the spaces of the rows. A shelter belt made in this way on the north side of a square ten acre field would require 130 trees, and for both north and west sides double that number."

Mr. Leslie adds:

"I prefer the Norway spruce wholly to the deciduous trees and evergreen mixed, as, in the latter case, the one kind checks the growth of the other.".

Mr. Beadle also notices the fact that, while the lower branches of the other trees if they were allowed to interlock, would die in a few years, the Norway spruce becomes closely interwoven without the least injury, and forms a hedge so perfect the wind will hardly play through it at all.

Planting out Evergreens.

With regard to the planting and removal of nursery evergreens, Mr. Beadle says: "As a rule it is more difficult to transplant evergreens than deciduous trees, just because the foliage is always present in evergreens, whereas you can plant the others when it is not. But by taking evergreens just in the beginning of the spring, before they start into growth, if the season is not exceptionally dry, they are easily transplanted. The secret of transplanting them successfully is to transplant them when they are quite young, then let them stand for two years, take them up and set them further apart; give them two years more and then transplant them again. If evergreens were transplanted four times before they came into the hands of the purchaser they would hardly meet with a death. But most men would sooner pay a few cents apiece for trees which have been transplanted once than pay a higher price for trees which have been frequently transplanted. Our people have not yet been educated into a knowledge of the difference as they have been in Europe."

Mr. Leslie makes a very similar suggestion. He says:

"My advice would be, unless the ground is in extraordinary good condition, to take the young trees as they are received from the nursery and make nursery rows of them, give them a little care until they arrive at the height of 18 inches or two feet, and then put them into permanent positions. They would require from two to three years to grow to this height, and would then be a good size to transplant. After that their ordinary growth is two or three feet per year in good soil and fully two feet in any soil, so that in six or seven years the farmer would have a good shelter."

FOREST FIRES THE GREAT DANGER.

Enormous as has been the wanton destruction of timber by the axe in localities entirely unfit for cultivation, which ought to have been carefully preserved as forest land, by far the greater amount of damage has been done by fire which in a single day can desolate a larger region than could be denuded by years of reckless slashing. The prevention of forest fires therefore is one of the most important features of any adequate system of forestry. It is of no avail to set apart parks and reservations or to enact pains and penalties against timber stealing, so long as the woods are left exposed to wholesale destruction from the carelessness of campers and hunters, or the want of proper precautions in clearing land.

A writer in the New York *Tribune* speaking of this weak point in the forest reservation policy of the United States as it affects the western forests, says: "The people living in the arid region know that for every tree cut a hundred are destroyed by fire. They realise how silly it is to punish a man for stealing a few logs while fires are permitted to destroy thousands of them. They laugh at the law, and a jury cannot be found which will send a timber thief to prison. This is only natural. It cannot be expected that the public will respect regulations with regard to cutting timber upon government lands when they see year by year large districts swept bare by flames as is still the case in some parts of Canada.

The attention of the people of the United States, especially on the Pacific slope, where so much depends on the forests of the Sierras for maintaining a supply of water for irrigation purposes is being forcibly directed to this evil. The damage done by fire can hardly be estimated. Mr. Thomas Magee, writing in the *Overland Monthly*, states that the fires caused by careless sheep raisers pasturing their flocks in the upper Sierra have for the past twenty-five years destroyed timber worth at least double the value of their entire wool crops. Last summer and fall the sheep men were driven out of the Yosemite reservation by the government patrol. The result was that no fires occurred in the woods, a thing unprecedented during a quarter of a century. The lighting of a fire in a wooded region even by careful and experienced persons frequently causes a conflagration, because

dead pine needles and underbrush during the dry season are as combustible as tinder and the slightest spark may spread devastation for miles around.

Mr. Arthur DeWint Foote, President of the American Society of Irrigation Engineers, who is naturally interested in forest preservation owing to its bearing upon the question of water supply, strongly urges that the states and territories interested in the reclamation of the desert region should have full control of public lands within their borders now owned by the federal government. The most forcible argument he advances is the continual danger to the forest from extensive fires, and the necessity of adequate protection by a system of fire patrols under the direction of those whose local interests are involved in their preservation. Some of the points in the following extract from his letter, which appears in the New York *Tribune* of the 20th of May, are of general interest, as showing the practical utility of the fire patrol system and correcting wrong impressions as to its expense.

The recent Irrigation Congress in Salt Lake City included some of the ablest men of the arid region. After three days of full and open discussion, they passed a resolution asking congress to cede in trust all the lands of the arid region—except mineral lands—to the states and territories therein. Perhaps the strongest argument put forward was that the states might, from the revenue derived from these lands, provide for the proper protection of the forests. They said to the government, grant us these forests which you are giving up to destruction and these grazing lands of which you can make no use, and we will save the one and develop the other.

A Board of Waters, Lands and Forests in each State will have the entire control of these great interests. The task is one of grave difficulty. It will call for men of engineering skill, men skilled in the law, men of executive force, and above all men of patience successfully to solve the problems which it will include. With the revenue from the lands such men can be secured. One of their first duties will be the establishment of a system of forest patrols, one to each thirty miles square, who will roam the forests the summer through. When in the still morning air a thin pillar of smoke rises from some deserted camp fire, the patrol at his post on a high bare point will hurriedly saddle his horse and before the day wind has fanned that smoke into a flame water from his leather bucket will have quenched the fire.

The destruction of the forests comes, not from the great number of fires, but from the few that are never put out. People are more careful about their fires in this region than is generally supposed, but there are no rains until the autumn to put out those that get started. In the Yellow Stone Park, although thousands of camp fires are made every year, the patrol have little difficulty in keeping down those carelessly left to run. It is the fires coming in from the outside that make the trouble and are fast destroying the wooded beauty of that wonderland.

This "Army of Patrols" which would be necessary to protect these forests is not a very formidable one. The state of Idaho has within its borders about 10,000,000 acres of forests and would require about 175 patrols. To maintain this force should cost the state about $60,000 per annum. The state has also about 20,000,000 acres of grazing lands. One-quarter of these rented at two cents per acre would pay the expense of the forest patrol and $40,000 more. The services of these patrols would also be in demand for watching and regulating the cutting of the forest products. There is no reasonable objection to cutting much of the timber of these forests. If properly done it would be a marked benefit.

It is proposed that these forest and grazing lands be ceded to the states in trust only; the state to retain complete control of the forests and to rent the grazing lands on long terms, in tracts not exceeding 5,000 acres to any one person. With the security for his improvements which this long lease would give, the settler would fence his allotment and secure water, either by developing springs or by artesian wells, irrigate a garden and perhaps an orchard. Soon these vast rolling plains which now appear so endless and so desolate would be dotted here and there with patches of green, and each would be a home surrounded by grass and gardens and trees. The endless war between cowboy and sheep-

herder would cease, because each would keep his bands within his own enclosure. The enormous wasteful herds with their annually starving thousands would be dispersed, and a sturdy though sparse population would find plenty where now is but a dreary waste under the domination of great cattle companies.

One of the principal sources of danger in our own backwoods is the building of fires by farmers for the purpose of clearing or burning rubbish. Many of these fires are unnecessary. So far as the destruction of leaves, rubbish, brushwood, etc., on a farm already cleared is concerned ; it would in most cases be far better if these substances instead of being burned were piled up and permitted to decay when they would return to the soil many valuable elements of plant-food which are now dissipated in smoke. Fires for clearing the land ought never be permitted in the dry season or during high winds. Legal restrictions may do something to check the reckless lighting of fires which yearly causes so much loss and destruction, but the education of public opinion will accomplish a good deal more, as laws of this nature are difficult to enforce. The good effects of the fire patrol system, so far as it has been adopted in the timber regions of the Province of Ontario have been noticed already in a marked diminution in the number and extent of forest fires, and the cost has been trifling as compared with the immense saving effected. But much yet remains to be done in this direction, especially in the way of overcoming public apathy and indifference and arousing the community to the magnitude of the interests at stake.

LANDSCAPE GARDENING.

The art of landscape gardening is closely allied to forestry. While the former has for its object the retention and enhancement of the beauties of the natural scenery by artificial arrangement, the latter aims at the preservation for purposes of practical utility of the trees which form Nature's chief adornment and constitute the principal charm of landscape. Thus the two branches of sylviculture have in the main a common purpose. A knowledge of the principles of landscape gardening and a widespread diffusion among the people of an artistic sense of beauty leading to an appreciation of the picturesque and majestic in nature and a desire to adorn and beautify the home, would make the task of the forester a much easier one. Considerations of utility and profit would be seen to unite with those of sentiment and poetic appreciation in demanding the preservation of the woodlands and calling a halt to the ruthless vandalism which is as heedless of future material welfare as it is of æsthetic taste.

Though landscape gardening is generally regarded as a term applicable only to the beautification and adornment of the homes of the rich, or to the laying out of public parks, gardens and cemeteries, there is no reason why its principles should not be adopted on a smaller and less expensive scale in the improvement of many a country home. Every farmer in choosing a site for his house or barn, in deciding where to plant trees or leave a strip of woodland, ought to consider that the appearance which his farm will present ; the beauty or disfigurement resulting from his operations, will either be a joy and an inspiration to himself and family during the coming years or an eyesore and a constant source of dissatisfaction. Dull, monotonous and ugly surroundings, the lack of harmony and beauty in their daily lives, have more than anything else been the cause of the exodus from the rural districts to the cities. A farm house on an ill-chosen site without a tree standing near it to relieve the monotony of the prospect, with no grateful shade or cool expanse of vegetation, is a sight too often met with in our rural districts. A very slight amount of attention given to making the homestead attractive in addition to brightening the lives of its inmates would have added considerably to the money value of the property.

The following article on landscape gardening by C. H. Miller from the Philadelphia *Times*, though treating mainly of the more extensive and costly undertakings pursued in this branch of art, yet contains some valuable suggestions which may advantageously be put in practice on a humbler scale by those seeking to accomplish the harmony and the bridal of beauty and of use.

In the choice of situations for a country residence, attention should be particularly paid to its convenience in site and position with regard to the adjoining country, so as at once to be in itself picturesque and at the same time to afford picturesque views to the inmates. When the surface of the location decided upon is but slightly raised, the highest point will be found generally the best, most appropriate and agreeable, but, on the other hand, if the hills are high and inconvenient for easy access, a gentle slope at the bottom will naturally be the best situation for the residence.

The bank of a swiftly running brook or the margin of a lake, particularly where the banks are well wooded and diversified with overhanging cliffs and rocks, will afford a good situation. On such a location as thus described, the building itself should be somewhat irregular in shape and outline, and careful attention should be paid to the position of the principal rooms, and the carriage entrance should be so located as to admit of easy approach.

The style of the building should be in harmony with the surroundings, designed and regulated in accordance with the nature of the situation. In an exposed situation, the mansion should be planned to have the appearance of strength and solidity. On lower levels, where the trees are healthy and luxuriant, their outlines narrow, round and flowing, the building may be high, light and elegant. Large and more splendid edifices should be located so as to have ample space around them, large acreage, broad horizons, generous lawns and long sunny glades. Parks and woodlands are the *sine qua non* for such lordly places.

Artists and men of taste all acknowledge that forms of beauty are composed of curved lines, and I may add to this that in gardening the more gentle and gradual the curves the more beautiful are they. The same principle applies to the surface of the earth as to other objects. The most beautiful shape in ground is that where one undulation melts gradually and insensibly into another, and landscape gardeners well know, or should know, that no grassy surface is so captivating to the eye as one where these gentle swells and undulations rise and melt away gradually into another form.

Many places are more appropriate for the growth of some kinds of trees than others; this fact should receive the particular attention of the landscape artist, for trees well placed as to form and color are the most elegant appendages to landscape scenery. The artist should be thoroughly acquainted with the material that he has to use. It is absolutely necessary that he should have a thorough knowledge of the habits and growth of trees of all kinds. There is an art in the planting of trees alike for shade, shelter or for ornamental purposes. The knowledge of where to plant is just as essential as to know how to plant, and no man can be a successful landscape artist who is ignorant of the science of planting, be it either for utility or ornament.

Where a surface is quite level by nature the artist should content himself with trusting to planting and the arrangements of walks, buildings, etc., to produce beauty and variety, and should always in such cases rather expend money in introducing groups of choice plants and other works of positive artistic merit than to terrace and unmake what character nature has stamped upon the ground. Positively ugly and forbidding surfaces of ground may be made highly interesting and beautiful only by changing their character by planting.

In planting with a view to natural beauty the effect of the design of the whole is the first and grand consideration. All planting, as respects the formation of a country residence, is generally influenced by the character and situation of the house as the main feature in the composition. This object in view, the expression of art and design suggest the employment of different species of trees and shrubs to those which are natural to the locality. The selection of trees for such purposes calls for the exercise of much taste and discrimination, and should hardly be undertaken by those who have but a slight knowledge of the subject.

A landscape gardener should be able to unite practice and theory, should be expert in drawing both in field and indoor work, and should know something of geometry, the management of squares, levels and lines, be well acquainted with projection and perspec-

tive, that he may anticipate the resultant effects of his work, and he should possess still further requirements to enable him to claim the title of artist.

The gardener who has succeeded in raising a new chrysanthemum, a rose or carnation, who has produced something where another man has failed, is, in his line, an artist. And he is more than an artist; he has done something more than nature unassisted can do. Suppose we have a young, growing tree that, by bad pruning or by accident, or otherwise, has been deprived of its main shoot—to use a professional term, its leader—and thus by giving additional strength to the top lateral branches has permitted them to become aspirants for leadership. The shape of the tree becomes abnormal; it is broom-headed and unshapely. Now put this tree in the hands of a practical man who thoroughly understands his business and is able to comprehend what nature intended. He will select the stoutest and straightest lateral leader, will tie and secure it in an erect position, shorten in the disputing laterals, thus giving greater strength to the new leader. Under this treatment the young tree will soon assume the shape that nature intended. Now the first man who has the disposition and the ability to do this and similar things is an artist, and something more than an artist, for he is capable of changing and assisting nature and of studying her various moods. And the man who is capable of changing the rough, uncultivated and barren lands into productive fields and pastures, and again by judicious and tasteful planting of groups of trees, convert them into a beautiful landscape of woodland lawns and meadows of park and garden scenery, is an artist and a great artist. Those who look on the profession, not as an artistic study, but rather as a commercial pursuit, never can become great landscape artists.

It would not be out of place for me, as a landscape gardener, to speak of some of the improvements that are contemplated in the near future towards the adornment of our city.

A few well-chosen trees, properly planted and carefully tended, with a good, thick, closely mown carpet of grass, will be more appropriate than a struggling mass of unshapely objects. That trees increase atmospheric humidity, absorb malaria and produce a refreshing coolness is an established fact. They are the best and most health-giving agents that can be introduced in densely populated cities. They should not, however, be planted so thickly in the squares as to interfere with the free sweep of light and air or to prevent the free growth of grass between them. Patches of shade and sunlight are most productive of a free circulation of fresh dry air so essential to health and comfort.

Trees, either for use or ornament, or both, must have ample room for development, and a wide pavement is absolutely necessary for the purpose. They should be planted far enough from the house line to allow for the free circulation of air, or the prime object is defeated.

Trees that are best adapted to planting in the city thrive just as well when planted under a brick or stone pavement as when planted in narrow strips of grass, and the pavement is much more easily kept neat and clean, whereas the borders would have to be freshly sodded every season besides requiring constant attention every few days throughout the summer. To have well grown, healthy trees in the city the kinds best adapted to the purpose should be chosen, and only planted where there is ample room for their development. Good, wide pavements, well chosen trees and careful attention after planting are the conditions necessary to success in city planting.

THE SANITARY VALUE OF FORESTS.

Apart altogether from the value of forests in conserving the climate and furnishing provision for our commonest material needs, their utility from a sanitary point of view is one of the most powerful, though perhaps least regarded, arguments for their preservation. It is obvious that the climatic changes resulting from extensive deforestation, which are unfavorable to fertility by causing drouths, floods and exposure to parching and sweeping winds, cannot be otherwise than directly injurious to human health. The

absence of trees which transforms once fruitful and productive areas into barren deserts not merely robs the population of the formerly abundant means of subsistence but in addition renders it less adapted for the abode of civilised man. Forests influence the health by their effects upon the constituents of the atmosphere and the water supply, their absorption of noxious gases and emanations and the healing balsamic virtues of their exhalations.

A knowledge of some of the primary truths of animal and vegetable physiology is essential to a thorough appreciation of the relations which the two leading divisions of organic life sustain towards each other. That each has an important bearing on the other is evidenced in the fact that the carbonic acid exhaled by the animals is absorbed by plants, which build up their tissues with the carbon and restore the oxygen to the atmosphere. Respiration, which is an animal function exclusively, supplies the system with continual draughts of oxygen, the prime necessity of animal life, which combining with the effete and worn out tissue promotes its removal, thus making way for new tissue substance. This renewal of the system by molecular metamorphosis must continually go on so long as life remains. In this way, every living animal is exhaling into the atmosphere, carbonic acid which can only be decomposed and rendered harmless by an abundant vegetation eager to absorb and assimilate this otherwise poisonous element. The decomposition of vegetable matter and all dead organisms and the combustion of fuel, oils, etc., in the production of heat and light also add immensely to the volume of carbonic acid gas with which the air we breathe is charged until it becomes more or less purified by the demand of the vegetable world for this important constituent of plant growth. The action of vegetation in decomposing the carbonic acid is believed to be the only source of free oxygen and means of renovating the atmosphere surcharged with animal emanations. "Hence" in the words of Prof. Gray "the perfect adaptation of living beings to each other; each removing from the atmosphere what would be noxious to the other; each yielding to the atmosphere what is essential to the continued existence of the other. The need of a due proportion of vegetable to animal existence is strikingly shown in the aquarium where aquatic growths fulfil the same function in regulating the purity of the air in water that land vegetation does in the atmosphere. If the equilibrium is disturbed by too great a preponderance of animal life, the fish or other inhabitants sicken and die for want of oxygen. The necessity of vegetation in sufficient quantity and luxuriance to counterbalance the presence of a large population and keep the atmosphere pure by absorbing carbonic acid and giving forth oxygen is an established scientific truth. And of all kinds of vegetation trees will best fulfil this sanitary function, because the carbon assimilated by them is more permanently withdrawn and retained for centuries, being finally returned to the earth as *humus* instead of given out to the atmosphere as carbonic acid.

The importance of an adequate water supply for sanitary purposes is a matter universally conceded, and the influence of forests in regulating and equalising the flow of water and forming a natural reservoir has been so fully set forth elsewhere that it would be superfluous to do more than allude to this phase of the subject. In addition however to the effect of forests upon the water supply, as the term is generally used, they perform a most important service in cooling the atmosphere during the parching heats of summer and averting disease.

Heat increases the capacity of air for water according to Camille Flammarion. At 14° Fahrenheit one cubic foot of air is saturated with one grain of water; at 30° with two grains; at 56° with five grains; at 80° with eleven grains; and at 88° the point of saturation is not reached until fourteen grains of water have been added to each cubic foot of air. It follows that the effect produced upon climate by a copious supply of water to an atmosphere at a high temperature must be very marked. Now trees in addition to their influence upon terrestrial radiation, are able to draw up moisture from a lower level than that attainable by smaller vegetable growths, and give it out through their leaves, an enormous volume of aqueous vapor is thus exhaled by every large tree in full leaf and healthy condition. The experiments of the German scientist Von Pettenkoffer showed the amount of evaporation to be no less than eight and one-half times more than the volume of the rain

fall upon the same area. The moisture thus supplied to the atmosphere is often drawn up from great depths, and is an important factor in mitigating the severity of extreme drouths and preserving healthful conditions.

Forests and smaller areas planted with trees are of undoubted value in preventing the dissemination of malaria. That form of disease is due to the combined influence of heat and moisture, and recent investigation has proved that many of the conditions of its growth and diffusion are capable of being controlled. Experience has shown that forests and tree-belts form an effective barrier to its transmission. The eucalyptus among trees and the sun-flower among annuals are considered the most useful of their respective classes as destroyers of malaria. The ancient Romans recognised the value of forest masses as a barrier against the diffusion of fever germs, and to secure them againt destruction invoked the protection of their divinities. Prof. Flint has expressed himself as follows on the subject: "Malaria has an attraction for trees and other organic materials. It is found to be perfectly practicable to prevent the access of malaria to dwellings by planting large trees or thick shrubbery in the immediate vicinity between the originating points and the house to be protected." Prof. Metcalfe in his "Monograph on Malaria" says: "Malaria has an affinity for dense foliage which has the power of accumulating it when lying in the course of winds blowing from malarious localities."

The turpentine exhaled from pine and hemlock forests possesses in a larger degree than any other substance as far as known the power of converting the oxygen of the atmosphere into ozone. This agent owing to its remarkable affinity for the products of decomposition purifies the air by the destruction of deleterious gases and the oxidation of decomposing organic matter. Hence the high estimation in which the pine-growing regions are justly held as sanitary resorts where the purity of the air strengthens and renovates the system debilitated by the foul atmosphere and unsanitary conditions of our crowded centres of population. Viewed from this aspect as a purifying agency for keeping the air we breathe fresh and bracing, and destroying by its power of absorption the germs of disease, the forests have a value far greater than can be estimated in money, and their preservation is a matter not merely affecting the volume of the national resources and the fertility of our fields but the physical well-being of the people and the fitness of our country for healthful habitation.

FORESTS OF EUROPE.

In any attempt to improve Canadian forestry it is necessary to look to other countries, and especially to Europe. It is not that the other continents do not possess timber; in both Asia and Africa the forests are immense, every river flowing through forest land exhibits a continual succession of rafts. But they are little known; great cargoes of wood do indeed regularly descend these waters; but the European or American would find it often difficult, and in some cases impossible, to penetrate to their sources.

In Europe, on the contrary, we have the results of many years of timber culture, records of the various methods of treatment pursued are regularly kept, and available for future use. So far as is possible, considering the difference of climate, we find there any number of examples of forest work, from the preparation of the ground to the cutting of the timber. Their methods are different; for instance, trees are often sawed off close to the ground. Their tools, too, are unlike ours. The axe of the English woodman differs in shape from our well known tool; the handle is often straight, and the steel much narrower and projecting an inch beyond that used here. The accompanying article by Mr. Putnam of Wisconsin, contains much valuable information, especially with reference to the number of men employed, and the manner in which they are promoted. The last paragraph, concerning the too rapid destruction of the forest, is very telling. It is furnished by *Garden and Forest*:

While in Europe in 1885 I noticed in Germany, particularly on the lower Elbe, the Spree and generally over the old worn out lands, that much was being done to preserve the old and replant new forest trees in regions from which 200 or 300 years since the

forests had been destroyed. At the schools of forestry intelligent men asked, " Why do not you Americans learn by our errors and do something to save your forests now?" The only reply I could make was that I hoped we might begin to save before we were driven to it by necessity as other nations have been.

The new forests over Prussia from Hamburg by way of Berlin through to Breslau and in the circle with the distance from Berlin to Dresden as a radius are doing well. It is common to see plantations largely of pine of from forty to six hundred acres ten, fifteen, thirty-five and fifty years old, all within a few miles of each other, the different heights of trees on the land lines sharply showing their different ages. Some of the older trees are sixty feet high and eighteen to twenty-five inches in diameter, all growing very even and thick. These plantations are kept clean, with the lower dead branches broken off for use by poor people as fuel, and all this on land that looked light and as if it had been run out like the "old fields" of the Carolinas and Virgina. Many of those new forests in Germany were being cut clear for the timber, lumber and wood, others were being preserved with the best trees cut out and sold under care of foresters. The land itself was being revived and was approaching a virgin condition again. These new forests now furnish the timber of the country.

In the forests of Saxony and Bohemia, up the Elbe and Spree, more particularly of of Saxon Switzerland and up the river Elbe into Bohemia. I visited some twenty or thirty mills that were sawing timber grown upon the streams tributory to these waters. Some good trees were worked up here thirty and thirty-six inches at the butt end, and cut the whole length, say sixty to seventy feet long. In the larger mills the whole log is run through gang saws, and then the product is tied up as one log by itself and so sent to market slab and all. The saws used were thinner than ours. Very small logs, too, often no more than five inches in diameter, are cut. The price of this lumber was no more than it is in the Middle or New England States, but of course the Europeans use less lumber than we do. From an extensive examination of Germany, Austria, Belgium and north-eastern France, northern Switzerland and the Duchy of Baden, I should say that under the wonderful care and intelligence of the present system the forests were quite keeping up with the demand for the common lumber wants of the country, and some even being shipped to Portugal, Spain and the Mediterranean. I visited the saw-mills on the Necker and the Rhine, climbed the Feldberg and the Taunus, and saw foresters carefully cutting and sawing the windfall trees and planting a new one for every tree taken out. The Government is doing so much for the forests everywhere. In the little province of Baden, smaller than some of our New England or New York counties, over 100 men are employed and paid by the Government to care for the woodlands. In Saxony and Bohemia I went to the homes of the foresters, and found some of them experts in various branches of natural history. The heads of departments were graduates of some school of forestry, and they were advanced as they deserved and held their offices for life or good behavior, The Germans have waited until their timber was cut off before the began to replace it, but they are now prosecuting the work with rare patience and skill.

In the summer of 1887 I visited again the British Isles, and examined the lumber industry of the eastern coast, of Edinburgh particularly. I saw much of the lumber of Norway and eastern Russia as it was brought into England. There is little large or wide timber left in those countries. Much the same process of stripping forest areas has gone on there as in the countries before named. There is much less timber in Norway, Sweden and Russia available than is generally supposed and its quality is poorer—sound enough, but hard and full of knots, very much like the lumber of lower Europe. Evidently virgin forests of the north temperate zone are in North America. The impression created by the European forest examination made by me in 1885 and 1887 is this: Trees will grow if properly planted and cared for, but it is like the first attempts in raising the tame grasses from the old farms of the east in the virgin prairies of the west. The soil seems rich enough to grow timothy, but the cultivated grass will not flourish until the wild " nature " of the soil is subdued by many plowings and trampings of the tame cattle; even so, when land has been stripped of woods and worn by farm crops, it is hard to recover it with forest. Just here the aid of science is needed. Here is work for the

schools of forestry that have done so much for France and Germany. The forest restoration of Europe is due to science, and is accomplished by men trained for the purpose.

Again the more regularly distributed rainfall of western Europe, especially in the north and Baltic countries, is more favorable to the restoration of forests than in America generally, though in some parts of Europe the soil is so much worn out it is almost impossible to make trees grow. Indeed, all over Europe, and especially east and south of the Mediterranean, and over most of the older settled portions of the Eastern Hemisphere, is seems to have been the especial mission of the Aryan race to destroy and remove the forests from the face of the earth.

In the lumber yards of England, Scotland, Hamburg, Bremen, Antwerp and France I saw much of the timber from America. Our forests are drawn upon to supply the waste of centuries in the old world. It is time we began to think of husbanding our own resources.

THE ONTARIO FOREST RESERVATION.

A most important movement in the direction of forest preservation is now being made by the Ontario Government. A large tract of country is about to be set aside as a forest reservation. The place suggested is principally in the Nipissing territory, and it is supposed will embody twenty or more townships. It is well calculated for the purpose, being largely interspersed with small lakes and numerous streams, thus forming reservoirs of water to feed the rivers flowing into the greater lakes to the south and north, giving moisture and fertility to the lands through which they pass, the great factor in agricultural success. It may be remarked here that the passage of water, or rather the vapor of water, through the ground is the means by which all food is conveyed to plants. The rain falling on the earth assisted by numerous little rivulets under the surface is perpetually drawn again into the atmosphere by the heat of the sun, and in its passage among the plant roots, carries their necessary food to them. This again points out the value of lines of trees, especially evergreens, which prevent the too rapid progress of the wind over the earth, and keeps the ground after a shower much longer in a moist and growing condition. This, namely, the acting as a feeder of rivers and streams, will form one of the most useful features of the reservation in question.

This portion of country possesses highly diversified scenery. There are many ranges of lofty hills, many broad and pleasant valleys and many rapid streams. Here and there is many a stretch of barren and rocky land, now covered with trees, which, with a little care can be preserved. In such a reservation they can be preserved, as there will be rangers in charge whose duty it will be to attend to these and many other matters. It may be noticed that this will not take any land from the farmer. The ground is generally unfit for agriculture, owing to the poor quality of the soil. It is by no means such land as the southern portion of Ontario possesses. Here the foundation is limestone, but to the north we find the Laurentian formation, and the rocks of everlasting granite. The soil covering this is light, poor, and often of a peaty nature. It will, if well cared for, yield good crops of grass; but it is not needed for that purpose, there being vast areas, yet unsettled, adjoining, equally well adapted for the purpose.

There is yet another point in which reservation will be extremely valuable, it will form a place where many wild animals and many birds which it is desirable to preserve will find a comparatively secure resting place. Some of these will of course now and then be destroyed, but the complete depopulation of the forests, which occur when no means of preservation are taken, will be prevented. It will, to a certain extent, form a breeding ground which will supply the rest of Ontario with game. For instance, there numerous creeks and ponds are the favorite resort, in fact the very home, of the beaver, one of our most valuable fur-bearing animals. Such a place will in time form a most agreeable resort for those who go to the country, not to destroy life but to enjoy nature. It can be seen there in all its various aspects. I have never known elsewhere such storms as those that rage among our northern woods, nor such a calm as afterwards settles over the whole

landscape. When up there one can understand the feeling which possessed the old hunter who, hearing that a settler was clearing within fifty miles of him, moved his own camp fifty miles further back, for fear he should be crowded and not be able to breathe comfortably.

The measure of preserving a large portion of forest or prairie land is now being largely adopted in North America; the United States have laid aside, in their western territories, several large parks; the Ottawa government have acted in a similar manner in laying aside a large park on the Rocky Mountains. That which is now being planned by the Ontario government will be of great extent and of great value to the country. Various states and municipalities are also making great endeavors in this direction, the state of New York, already possessing a great tract in the Adirondack mountains, is trying greatly to enlarge it by purchase; it was full time, for the destruction of the forests on these mountains was lessening the volume of water in the Hudson, and would in time have greatly impaired its value for commercial purposes. This effect is frequent and well known to those who have studied the matter. I have been shown by residents along the shores of our lakes various places where schooners drawing ten feet of water were formerly built, which now are but small creeks scarcely two feet wide.

It is of great importance, both from agricultural and commercial points of view, to preserve numbers of trees on the higher lands. There are in settled Ontario several watersheds, both ridges and hills, on and near which I should like to see the present bonus for tree planting doubled. This measure would, it appears to me, result in a largely increased number of trees being yearly planted in those localities, and be of great benefit to the agricultural lands on which water pours from their greater elevation. For, as has often been repeated, a wooded country, or even only a wood lot, in an elevated position, will hold moisture and gradually part with it to the benefit of the surrounding lands; while, from a cleared height, it would merely pass away in a torrent, of little use, and indeed often of injury to the farmer.

These forest reservations, will in the future, be the subject of grateful remembrance on the part of those who shall then possess the land; and those legislators of our present day who shall be instrumental in securing to our successors such undoubted benefits, will receive the praise rightly due to their efforts. It may well be also, that the value of proper forestry management will by that time be so much better appreciated, owing to its results being observed, as to cause the preservation of many woods, and the planting of many more. For nothing is more certain than that it is to planting we must look for the ultimate maintenance of sufficient forest, in localities where we have largely destroyed the original trees.

Another, and a very great, value forest reservations will give, will be the opportunity of trying experiments in planting and preserving trees. It might well be that such trials would enable us in time to restore much of our ancient forest. It is true that it would be a matter of time, but the land would always be the more valuable for the trees, as, if fire can be kept away the owner could always reckon, in a certain time, on a very valuable return. The old forest only gave us a good tree here and there; but in a planted wood every tree is of a good variety, and placed in such a manner as to secure a full return from the acreage employed, and also to give all possible ease of access when it is desirable to cut.

It is to be hoped that the commissioners who are to examine the ground and report on the matter, will be able to give in a full report in time to allow action to be taken by the next session of the Provincial Parliament, so as to secure for all time to come the benefits which are to some extent above described. Other legislatures have proposed action in similar matters; but some of them, though possessing ample means, have performed much less than they proposed. It does not answer, in such a matter, to lose quarter centuries. No one can make certain of the future; but there is all reasonable probability, taking into consideration the class of men who have for many years so well managed the interests of Ontario, that good progress will be made, and efficient results obtained, in the securing and management of the new forest reservation.

STATE ENCOURAGEMENT TO FORESTRY.

It has often been proposed and advocated that legislatures should, either by establishing nurseries or buying trees, make a large yearly gratuitous distribution of young saplings fit for planting to those farmers and others who are likely to make good use of them. In Canada we are neither so rich as our neighbors, nor have we so many large landed proprietors possessed of such enthusiasm in tree planting, as they have the good fortune to retain within their borders. It will be seen, by the extract annexed, how largely American legislatures encouraged forestry, and how readily, in many instances, the encouragement given is taken advantage of. What will be particularly noticed is that many new and valuable trees are being cultivated, most of them apparently possessing qualities superior to those hitherto in general use. Large plantations of trees are now common in many of the states, and foremen are hired on farms especially with reference to their capability in tree management. In Kansas I saw several plantations each a mile square, and in other states many valuable blocks of timber, planted twenty years ago, now tall trees. On the Massachusetts coast they cover the light sandy land with fine forests, and find it pay, though the wood is only used for the roughest purposes, such as box-making. This is done by sowing, not by planting.

The article which follows, taken from *Garden and Forest*, is from the pen of F. M. Gallagher, Esq., Montecito, Cal. It would, of course, be better if such statements were obtainable from our own press. But few experiments, and none on a large scale, are made in Canada. In that case, the next best resource is to observe, and if possible, profit by what our neighbors are doing. The trees in which they experiment, spoken of here, are of course those suited to California; but their example could be followed here with those fitted for a Canadian climate:

Forest Experiment Station at Santa Monica.

In no other state of the Union are questions pertaining to forestry of more profound importance than in California. The immense bodies of timbered land in the north, the comparative treelessness of the south, and the supreme need of preserving every drop of water in all parts of the state for irrigation, give an unusual interest to every effort directed either toward the preservation of the forests we already have or to the plantation of new ones.

The work of the State Board of Forestry, though hampered by an insufficient appropriation of funds, and somewhat, also, by the usual considerations of practical politics, represents, nevertheless, a very creditable beginning of a movement which has already shown the wisdom and foresight of those who inaugurated it, and is sure to have a wide influence on the future development of the state.

One of the best-directed and most promising undertakings of the Board has been the establishment of two experiment stations, one at Chico in the north, upon land donated by ex-Governor Bidwell; the other in the south at Santa Monica, upon land given by Senator Jones, of Nevada, and his partner who own together some 40,000 acres of beautiful and fertile land between Los Angeles and the sea. This station comprises twelve acres, situated within half a mile of the Pacific, and includes a narrow valley with its sturdy little stream, and two benches of a few acres each, which form steps to the level table-land above, and give a desirable variety of soil and exposure. The work here is, of course, turned more particularly to the growing of such trees as are expected to be specially adapted to the southern part of the state. A large proportion of the trees are of Australian origin, and interest is centered chiefly in the two wonderful genera, Eucalyptus and Acacia, the Gums and Wattles, as they are known in Australia.

It was recently predicted by an eminent German forester, Dr. H. Mayr (*Garden and Forest*, vol. iii., p. 445), that in fifty years it would be inconceivable that southern California was once treeless. "Amid magnificent forests," said he, "of Australian Eucalyptus and Acacias, the visitor will be inclined to doubt that he is really in America."

Many thousand young seedlings are grown annually for gratuitous distribution, and the grounds of the station are being filled with specimen trees and with small plantations set out in various ways to test the practical value of the different methods of planting and culture. Of Gums there are some forty species represented by trees from two to three years old, and from five to thirty feet in height, which are now at the most interesting stage of growth. Eucalypts as a rule have a great diversity of appearance during the first two or three years of their life. The leaves and habit change as the trees grow older, and assume, to a large extent, the same general character of long, pendant, lanceolate, and more or less glaucous leaves and drooping branches, so that in old trees it is often very difficult to determine the species except by the flowers and seed-vessels. Many of the trees at Santa Monica now have both their youthful and mature forms of foliage, and many are beginning to flower—a precocity certainly remarkable in trees which grow to such an immense size.

The foremost of the Eucalypti as regards the number grown in California is the *E. globulus*. The cultivation of this species has passed the experimental stage, since it is grown by nurserymen by millions annually, and it is planted throughout the state, sometimes in groves quite large enough to be called forests. The extremely rapid growth of this tree, and the high price of fuel, make it a profitable investment for planting. A tree of this species, recently cut at Santa Barbara, three years and nine months old from the seed, measured forty-three feet ten inches in height and eight and three-quarter inches in diameter at the butt. This tree was not an isolated specimen, but was in the midst of a grove planted eight feet apart each way.

The Red Gum (*E. rostrata*), is also established in California. Its growth is less rapid than that of the Blue Gum (*E. globulus*), but its lumber is more valuable. The wood is stronger, more easily worked, and more durable for such uses as posts, telegraph poles, railroad ties, and especially for piles, since it is not attacked by the Teredo.

Aside from these two species, but few of the many excellent Eucalypts were generally known here until brought into popular notice by the efforts of the State Board of Forestry. There have now been distributed through the state from Santa Monica a large number of new species worthy of attention for the different qualities they possess. Specimens of these at the station are already large enough to show indications of their value, and to give some useful hints to those desiring to plant.

Among the more noteworthy is the Sugar Gum (*E. corynocalyx*), a tree of rapid growth and handsome appearance. It is more umbrageous than most Gums, and produces a hard, strong wood, remarkable for its durability under ground. The chief merit of this tree, however, is its adaptability to the most arid localities. It has been recommended by Baron Von Müller for planting in the Algerian regions of the Sahara, and has succeeded well in Southern California on dry and rocky foot hills impossible to cultivate. A specimen of this species grew during its second year from planting from eight and a half to nineteen feet in height.

E. viminalis, the Manna Gum, is one of the hardiest species, and has been extensively distributed to the cooler districts of the state. It will stand for a short time without injury, according to Monsieur Naudin, a temperature as low as fourteen degrees Fahrenheit. Though a shapely tree for avenue planting, and almost as rapid in growth as *E. globulus*, its wood is softer and less valuable than that of many other species. The custom is almost universal among the nurserymen here to sell this tree as *E. rostrata*.

E. marginata, the Yarrah, which is famous for the resistance of its wood to attacks of the Teredo when used for piling, and which forms such extensive and valuable forests in west Australia, has proved of rather slow growth at Santa Monica. Its increase in height does not exceed two or three feet in a year.

The station has a number of fine specimens of *E. amygdalina* and *E. diversicolor*, trees which, in their native soil, according to Von Müller, sometimes grow to a height of over four hundred feet, overtopping, perhaps, our giant Sequoias.

The handsomest of all the species at Santa Monica, at least in their present stage of growth, is *E. polyanthema*, or Gray Box. Its upright form and dense foliage at once

distinguish it, but its chief beauty is in the delicate pearly gray color of the leaves which, in the young growth, is almost lavender. On young trees the leaves are nearly round, and are gracefully curved. While not growing so rapidly as some others of the genus, the Gray Box produces very valuable timber, and has shown a capacity to resist extreme drouth.

Next in order of interest to the experiments with the Gums are those which have been made with the Wattles or *Acacias*. The Black Wattle (*Acacia decurrens*) is a specially noteworthy tree, as remarkable for its wonderful rapidity of growth as for its extraordinary beauty. But its chief claim to attention is in the value of the bark for tanning leather. The Golden Wattle (*A. pycnantha*), though not growing quite as fast, produces a bark still richer in tanning qualities. Thoroughly dried specimens have frequently yielded to a chemical test over thirty-six per cent. of tannic acid. These trees promise to give to California a plentiful supply of tanning material. The bark of the Chestnut Oak already commands $16 or $17 per cord in San Francisco, and the supply has yearly to be obtained from less accessible places. The tanners of the Coast appreciate the importance of the subject, and have shown considerable interest in the experiments of the board looking toward the more extensive introduction of the Wattles. In Australia and New Zealand the cultivation of these trees is rapidly spreading, some plantations containing as many as 3,000 acres, and apparently giving satisfactory returns. The trees are ready to strip when from five to seven years old, and an acre containing 1,000 trees is expected to yield over five tons of bark, valued at $35 or $40 per ton. The wood of the Wattles is used in Australia for spokes, staves, etc., and it makes excellent fuel.

Both these trees are very floriferous, and when in flower are masses of yellow bloom, the fragrant little golden balls hanging in innumerable racemes from every part of the trees. The Black Wattle seems to possess about the same degree of hardiness as *Eucalyptus globulus*. The Golden Wattle is more tender, but will do well in localities of extreme aridity, and is contented with a very poor soil. These trees being somewhat difficult to transplant, the experiment has been tried of planting the seed in cuttings of bamboo or cane four or five inches long, set up on end and filled with earth. One or two seeds are planted in each tube. When the trees are six or eight inches high they are easily transferred to the field, tube and all, without disturbing the roots, and the cuttings of bamboo are left to decay.

Another noteworthy tree is the Blackwood (*A. melanoxylon*). Its symmetrical shape, dense foliage and abundance of flowers make it a very desirable tree for avenue planting, while the wood, much resembling that of the Black Walnut, is highly esteemed in Australia for cabinet making. The Blackwood, like the Golden Wattle, belongs to the wonderful *phyllodineous Acacias*, no less interesting morphologically than they are curious to the most careless observer. The leaves on the young tree for the first few months are soft, feathery and bipinnate. The leaf stalks soon begin to broaden and lengthen out, until at last they become the somewhat stiff, leathery *phyllodia* which form the foliage of the mature tree, though sometimes retaining upon their tips, for two or three years, remnants of the bipinnate leaves of their youth.

These are a few of the more important of the many interesting trees which are being brought to the attention of California planters by the experiments at Santa Monica. The station is in charge of Mr. Wm. S. Lyon, an accomplished botanist and enthusiastic tester of trees, whose pen has, moreover, done much to bring about a proper public sentiment in regard to all questions relating to the forestry interests of the state.

RAPID DESTRUCTION OF WOODS IN ONTARIO.

In the first columns of this report will be found statements from the oldest counties in Ontario concerning he amount of forest remaining therein. In addition to much personal observation, these were obtained as follows : Leading men in various counties were

asked to suggest the names of persons likely to be best informed on the matter. These were applied to and their statements given in this report. These statements will not always agree with the ordinary municipal returns, as these latter are generally based on the assessors' reports, in which much land is set down as forest because it is not used for agriculture, although there may be little or no good timber upon it. Here we have the opinion of men of standing from each county, often life-long residents therein and no doubt capable of giving a good general idea on the subject.

It will be perhaps a disagreeable surprise to many of my readers to find that the stock of timber in many of the counties has diminished to such a small proportion. I have not myself been surprised by it, as during the last ten years I have frequently pointed out that such would be the necessary result of the course which we were pursuing. The causes of this rapid destruction of forest timber are various, and one of the chief of them may be mentioned. In the first place much timber is cut and sold during the winter for firewood, both for the sake of the money it will bring and to provide employment during the dull season of the year. It is not that other firewood could not be easily procured, as there is generally much dead and lying timber and mature trees which might as well be cut down and from which an ample supply might be obtained. But this is not the method taken. The chopper generally goes where he can quickest cut his cord of wood, and I have repeatedly seen a fine young bush of beech and maple scarcely nine inches through on the stump thus destroyed.

This method of clearing is not in the end valuable to agriculture. It enlarges the amount of cleared land, but it does not by any means enlarge the crops obtained. The limit of value in plowed land is the amount which the farmer's resources will enable him to keep in good heart, while as to pasture and meadow an expanse greater than can be kept in good grass and free from weeds is generally more of an injury than a benefit. These remarks do not of course apply to bush farming, where we merely clear the timber and drag in the seed. But the woodman only clears the way for the farmer who follows, and it is he who, now that our forest resources are rapidly dwindling, should endeavor to leave a reasonable proportion of timber on his land.

The uses of wood to the farmer are so various and its possession so necessary that it is full time we should endeavor to preserve it, but the habit so long common to Canadians of clearing the forest before them in every direction has deadened our feeling to the value of what we were destroying. The rapid disappearance of the forest, however, is compelling a change in public opinion. It is to be hoped that this change will be immediate and its results as lasting and valuable as the diminished amount of forest yet at our disposal will permit.

MISCELLANEOUS EXTRACTS.

At the late meeting of the American Forestry Association the committee on Arbor Day reported that the day was now officially recognised and observed in thirty-seven states and territories.

According to a report of the United States Minister at Stockholm, the greatest source of revenue to the kingdom of Sweden is its forests. That portion of the country which is called the Norland is still, for the most part, covered with extensive forests largely composed of pine and spruce.

Among the resolutions passed at the late meeting of the American Forestry Association was one urging upon superintendents of school in the various states to require that the high schools shall make forestry, in connection with botany, a subject of instruction, and it was further resolved that whereas the interests of agriculture are intimately dependent upon proper forest-conditions, and whereas the Government of the United States has lately made large additional appropriations to agricultural colleges and experiment stations, it is therefore earnestly recommended that forestry be made a part of the curriculum in the agricultural colleges and experiment work in the various stations.

In a letter to the American Forestry Association, ex-Senator Edmunds writes: "The subject of forestry is of immense importance to the future welfare of all our countrymen, as well in Vermont as in the arid regions of our one country. I have seen in Europe much of the remediless evils of stripping the hills and mountain-sides of their forests great or small, and I have seen in our temperate and well-watered climate of Vermont how great has been the loss from reckless timber-cutting. The devastations of a dozen years can hardly be repaired in half a century, and so every energy of reason and persuasion ought to be brought to bear upon the public intelligence to avert the evils that so seriously threaten large parts of the republic from the destruction of the forests."

"There is very little forest left in this state," recently said the *Pittsburg Dispatch*, "which is worth anything for lumber, and meantime the railways are consuming all the hardwood large enough to make a tie, so that there is no prospect of a renewal of our hardwood timber in a century, and the pine and other persistents do not readily reclothe the wastes. But worse than the loss of timber, for which substitutes may be found, is the fact that since the denudation of the forests our climate has become so uncertain that, even with the aid of the Signal Service, no business calculations can be based on the weather, and birds and animals have not yet acquired new instinct such as will enable them to serve us as barometers. Even the hoot-owl misses it as often as the Weather Bureau."

A writer in the *Gardener's Magazine*, London, speaks of the facility which the Douglas spruce manifests for accommodating itself to various soils in Great Britain. Some of the best specimens of the tree are found in rich loam or alluvium and in sheltered situations. At Eastnor Castle it drives its roots down through the fissures of the rocks, which are just below the surface soil, and flourishes well on the moisture there found for its support. It grows with great vigor among the slate rocks of North Wales, even up to the very summits of the hills, and seems well adapted to elevated situations where even spruce will not grow. In favored situations its growth is very rapid in Great Britain, and trees planted only thirty years have in that time reached a height of seventy feet, with a proportionate bulk of stem.

In the current number of *Meehan's Monthly* it is stated that the Girard estate has been making small forest-plantations in an experimental way to see if it was practicable to grow timber in the coal regions, where nearly every stick has been cut away for props and various other uses connected with mining, so that now almost every piece of plank used there has to be brought from a distance. Eight years ago seedling English larches and Scotch pines, one year old, were planted in furrows driven through the underbrush which was growing up where old forests had been cut away. The larches now average from seventeen to eighteen feet high, and are noticeably healthy. The larch is a mountain-tree, and thrives in comparatively poor soil, and as these plantings are 1,500 feet above the sea-level the tree has something of its natural conditions. The vigor of the trees shows that they appreciate this position.

Covering for Tree Wounds.—It often happens that, either by intention as in pruning, or by accident, trees are wounded in various ways. A common practice is to cover large wounds with coal tar, but this is objected to by some as injurious to the tree. Experiments go to show, however, that its use in covering large wounds is not injurious; but that, on the contrary, a callus readily forms under the tar, on the edges of the wound, and that the wounded part is thus protected from decay. There is, nevertheless, another objection; for if the tar be applied a little too thick, the sun melts it and it runs down on the bark of the tree. This can be obviated by mixing and stirring, and thus incorporating with the tar about three or four times its weight of powdered slate, known as slate flour—the mixture being known as plastic slate, and used for roofing purposes. It is easily applied with an old knife or flat stick, and though it hardens on the surface, it remains soft and elastic underneath.

ANNUAL REPORT

OF THE

BEE-KEEPERS' ASSOCIATION

FOR THE

PROVINCE OF ONTARIO

1891.

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY.

TORONTO:
PRINTED BY WARWICK & SONS, 68 AND 70 FRONT STREET WEST
1892.

ANNUAL REPORT

OF THE

ONTARIO BEE-KEEPERS' ASSOCIATION

1891.

To the Honorable the Minister of Agriculture:

SIR,—In again presenting our annual report we are pleased to be able to claim a year of activity in the work of the Association. The business of the Association is being carried on fairly successfully. The membership is not so large as last year, being one hundred and eighty.

There are at present eight local associations in affiliation with the Ontario Bee Keepers' Association, viz., the Bruce, Listowel, Lambton, Middlesex, Oxford, Brant, Haldimand, and Norfolk Associations. Each of these societies has sent in an annual report, except the last two. For particulars in regard to the reports of these we refer you to the reports of affiliated societies.

In regard to the financial report, there were grants of $25 and $10 given to the Toronto Industrial Exhibition Association and the Western Fair Association respectively, and each of the affiliated societies received a grant of $25. For further particulars we refer you to the Treasurer's report.

During the year there were two meetings of the Directors held, and for particulars we also refer you to their report. In regard to the inspection of foul brood, we claim that there is a great amount of good being done, as there are many cases being cured by the instructions of the Inspectors.

W. COUSE, *Secretary.*

OFFICERS FOR 1892.

President	F. A. Gemmell	Stratford.
Vice-President	A. Picket	Nassagaweya.
Secretary	W. Couse	Streetsville.
Treasurer	Martin Emigh	Holbrook.
Auditors	J. B. Ritchie	Walkerton.
	Archie Tolton	"

Directors :

District No. 1	W. J. Brown	Chard.
" No. 2	J. K. Darling	Almonte.
" No. 3	M. B. Holmes	Athens.
" No. 4	Allen Pringle	Selby.
" No. 5	S. Corneil	Lindsay.
" No. 6	W. Couse	Streetsville.
" No. 7	D. Chalmers	Poole.
" No. 8	F. A. Rose	Balmoral.
" No. 9	J. B. Hall	Woodstock.
" No. 10	R. McKnight	Owen Sound.
" No. 11	J. B. Aches	Poplar Hill.
" No. 12	E. A. Jones	Kertch.
" No. 13	D. A. Jones	Beeton.

ANNUAL REPORT

OF THE

ONTARIO BEE-KEEPERS' ASSOCIATION.

ANNUAL MEETING.

The twelfth annual meeting of the Ontario Bee-Keepers' Association was held in the City Hall, at London on January 5th, 1892.

The meeting was called to order by the President, A. Pringle, at 3 p.m., there being a fair attendance of bee-keepers.

The Secretary read the minutes of last annual meeting, which were adopted.

DIRECTOR'S REPORT.

To the Members of the Ontario Bee-Keepers' Association :

Your Directors beg leave to submit the following report :

During the year there have been two meetings of the Board, the first immediately after the annual meeting at St. Catharines, and the other to-day in London ; at the former there were the different officers and delegates appointed, the Secretary and Treasurer.

The matters of premium to members was discussed and decided that the book "The Honey Bee ; its Natural History, Anatomy and Physiology," by Thos. W. Cowan, be given to members for 1891 if it could be procured reasonably, which the Treasurer succeeded in securing.

The President, Secretary and Treasurer were appointed an executive committee. An appropriation of $200 was made to be distributed among the different affiliated societies, but that no society receive more than $30.

The President was appointed delegate to the Central Farmers' Institute ; Mr. Humphries a delegate to the Western Fair Association at London ; Mr. M. Emigh and R. McKnight, delegates to the Toronto Industrial Exhibition Association. A grant of $25 was given to the Toronto Industrial Exhibition Association, and $10 to the Western Fair Association, to be expended in prizes for honey, etc.

A committee composed of the President, Vice-President and Jas. E. Frith, was appointed to consider the danger of the introduction of foul brood into Canada through the importation of bees, and if found desirable to take such steps as will insure the protection of bee-keepers through quarantining imported bees where deemed necessary.

Messrs. Gemmell, Frith and Corneil were appointed a committee to look into the matter of Canadian bee journalism or the Association having an official organ.

The President and Secretary were appointed a printing committee.

The place of annual meeting was decided upon, being London on the 5th, 6th and 7th January, 1892.

At the meeting to-day the financial business of the year was discussed and all bills, etc. presented were passed and paid and the books of the Treasurer and Secretary were audited.

There has been a falling off in the membership this year from last which it is difficult to account for. Circulars were sent to many of the bee-keepers in the province inviting them to become members of the Association.

There has also been a falling off in the affiliated societies. The reasons for this was in some cases the roads were so bad that the members were not able to attend the meetings when called. The number of members on the roll of the Association is one hundred and eighty, and there are eight societies in affiliation. The membership of the six societies that have reported is one hundred and thirty-eight.

It is to be regretted that all the societies have not reported, but in one case the secretary has been away from home and consequently the report is not to hand and in the others the report will likely be in soon.

W. Couse, Secretary.

REPORT OF TREASURER.

Abstract of Receipts and Expenditure of the Ontario Bee-Keepers' Association for the year ending January 5th, 1892 :

Receipts.

1891.		$ c.
Jan. 8.	—Balance from last audit	51 88
	Membership fees for 1891	180 00
	Fees from affiliated societies	40 00
Aug. 29.	—Legislative grant	500 00
	Total receipts	771 88

Expenditure.

Literature distributed among members	124 09
Grants to eight affiliated societies	200 00
Grants to Industrial Exhibition and Western Fair	35 00
Expenses of delegate to International Bee-keepers' Association	20 00
Affiliation fee in International Bee-keepers' Association	5 00
President's expense account	59 10
Postage on books, etc	10 25
Travelling expenses, Exhibition committee	19 00
Allen Pringle's account, preparing report and postage	7 85
Printing	36 75
Secretary's salary and postage	59 73
Auditors	4 00
Directors' expenses	159 93
Sundry items	1 32
Total expenditure	742 02
Jan. 5, 1892.—Balance on hand	29 86

Audited and found correct this 5th day of January, 1892.

J. B. Hall, D. Anguish, } *Auditors.*

On motion, this report was adopted.

REPORT OF DELEGATE TO NORTH AMERICAN BEE-KEEPERS' ASSOCIATION.

To the President and Members of the Ontario Bee-Keepers' Association :

GENTLEMEN.—Pursuant to previous arrangements the 22nd annual meeting of the North American Bee-Keepers' Association was held at Albany, N Y. from the 8th to 11th December last.

If, in selecting a place of meeting, the object was to get together the greatest possible number of the largest and most successful honey producers in the world, Albany was well chosen. Within easy reach of that city are located bee-keepers who number their colonies not only by hundreds, but by thousands, and their products, mostly comb-honey, are reckoned by tons. It was a real pleasure to have an opportunity of becoming personally acquainted with such men as P. H. Elwood, Capt. J. E. Hethrington, G. M. Doolittle, Julius Hoffman, W. E. Clarke, W. W. Carey, J. E. Crane, Ira Barber, N. D. West, J. Vandusen, and many other bee-keepers of note belonging to that part of the country. Eleven states were represented, and there were three representatives from Ontario.

In accordance with instructions given to the officers at the annual meeting in 1890, the Association has been incorporated under the law of the State of Illinois, with head-quarters at Chicago. Besides the right to hold property, and to appear in court, it is expected that incorporation will assist in obtaining state aid for an exhibit at the approaching World's Fair. The opinion was expressed that inasmuch as our Ontario Society is affiliated with the North American, our Canadian producers should unite with those of the United States in making one grand exhibit, but the Canadian delegates replied that it will be found that the products of all the different countries will be grouped by themselves, and that for this reason Canadian honey cannot be staged with that of the United States.

At previous meetings Dr. A. B. Mason had been nominated on behalf of the United States, and Mr. R. McKnight on behalf of Canada, to take charge of the honey exhibit at the Columbian Exhibition. At the Albany meeting it was stated that Dr. Mason and his committee had interviewed the officials on the matter, and they were informed that, since the position to which the Dr. had been nominated will be one of emolument, it will be a matter of patronage. In consequence of this information Dr. Mason does not now expect to receive the appointment.

During the discussion which followed the reading of Dr. Miller's paper on the size of sections, the opinion was advanced that the form of an oblong is more pleasing to the eye than that of a square. Hence the reason wny we have oblong panes of glass, oblong windows, and oblong doors instead of square ones. It seemed to be the opinion of the meeting that oblong sections, like Capt. Hethrington's, which is $4\frac{7}{8}$ x $3\frac{7}{8}$ x $1\frac{5}{8}$, are handsomer than the standard section, which is square.

The matter of grading comb honey was referred to a committee which included the representatives of two of the largest dealers in comb honey in the city of New York.

The committee recommended four grades, Fancy White, Fair White, Mixed and Buckwheat.

The convention was favored with a visit by Prof Lintner, State Entomologist of New York. In his address he stated that the proper way to kill the larvæ of the codling moth is by spraying the fruit trees with an arsenical poison, just after the bloom has fallen. But he said fruit trees have lately been attacked by other insects, and, if these are to be killed in the same way, it is necessary to spray before and during bloom. He referred to the popular idea that spraying kills the bees, and said that as yet they have no conclusive proof that such is the fact. He asked the bee-keepers present to assist in determining this point. He requested that a search be made under any fruit tree which is known to have been sprinkled while in bloom, and if dead bees are found, to collect them, and take them to some chemist to be tested for arsenic. If arsenic should be

found to be present in such a case, it may be taken as conclusive proof that the spray had killed the bees, and the practice of spraying trees, while they are being visited by bees, will be discouraged in all cases. Mr. J. M. Hambaugh, a member of the Illinois legislature, was present and said he had charge of a bill to prevent spraying during bloom. In support of the bill he was furnished with facts which showed that large apiaries had been almost ruined by the fruit growers of the west spraying their trees while in bloom. He had heard that the bee-keepers in other states also were about to ask for legislation for the protection of their apiaries. A hearty vote of thanks was tendered to Prof. Lintner for his address.

Washington, D.C., was selected for the next place of meeting, with the unanimous understanding that the convention in 1893 shall be held in Chicago.

All of which is respectfully submitted,

S. Corneil,
Delegate.

Mr. Wm. McEvoy thought that bees were poisoned considerably, and thought there should be something done to prevent spraying at a time when it did not do the fruit any good and poisoned the bees. He thought there should be a committee appointed to approach the Government to have an Act passed to prevent spraying when not needed.

Mr. Charles Baker, a nurseryman near London, said he thought that great mistakes were made in spraying with poison, as it should be done after there was no danger of the bees being killed, and that time is after the bloom was over; and that often there was too much poison used, which killed the trees. He would approve of having spraying done away with until after any danger of killing the bees had passed.

Mr. Gemmell said that he finds a lack of knowledge of spraying trees at the proper time, and thought that there should be lectures given through the country on when and how to spray.

Mr. Alpaugh did not know that any direct evidence could be given to prove that bees had been poisoned by the spraying of trees, but thought that there was enough circumstantial evidence to prove it, he noticed that he lost bees in the City of St. Thomas when he did not loose them in the country, and believed it was owing to the spraying of fruit trees with Paris green.

Mr. Corneil said that a fruit grower had said that no intelligent fruit grower sprays his trees when in full bloom.

Mr. Wm. McEvoy said that bees could be killed by poison, as he knew of a case in Ontario county where a person had poisoned his neighbor's bees.

Mr. S. Travers, of Alvinston, was asked to attend this meeting by the Lambton Bee-Keepers' Association to bring the matter of spraying trees before the Ontario Bee-Keepers' Association, as that association thought there ought to be something done to prevent it when of no benefit.

Mr. Baker thought there should be two periods for spraying.

Mr. Gott, of Arkona, thought spraying a mistake and was opposed to it.

Mr. Baker said that bees would take poison.

Mr. Gemmell also said bees would take poison. For an experiment mix a little poison with any sweet substance and give it to the bees when there is no honey to be gathered, and it will be found that they will take the poison.

Mr. Humphries said he lost a great many bees by poison.

Mr. McKnight asked if honey taken from fruit bloom sprayed with Paris green would kill the larvæ.

Mr. Corneil thought that the larvæ would not be killed.

Mr. McEvoy said that he saw brood that had been killed with poison; he thought that the danger was as great to the larvæ as to the bees.

Mr. PRINGLE said he thought that poison taken along with honey would kill the bees if not digested.

Mr. ALPAUGH said that if there be Paris green in the honey and fed to the bees that brood and bees would both be poisoned.

Mr. FRITH said that he thought that the suck of the bee for carrying honey would not be affected by poison.

Mr. D. A. JONES said that bees taking whiskey in their sucks would become intoxicated.

PRESIDENT'S ADDRESS.

The President, Mr. ALLEN PRINGLE, of Selby, then delivered his annual address, as follows :

In meeting together again in our annual convention we naturally look not only back over the past year to see what *has been*, but forward over the coming year to see, if possible, what *will be*—or at any rate what we *desire* to be—for we are not always able to compass our desires or realise our anticipations. And if we are worthy citizens of this progressive age we will make every year an improvement on its predecessor, not only in the matter of bee-keeping but in every other matter.

We ought, therefore, to be better apiarists than we were last year and better men and citizens in every way.

It is sometimes said that there is nothing but change in the world. Now, while there certainly is something else in the world besides change, certain it is that everything is changing—even the granite rocks and the "everlasting hills." As to humanity and their doings, if every change is for the better, all hail to the changes ! But some of the changes are, I am sorry to say, for the worse. The bee-keepers, however, being an exceptional lot, are I think mostly changing for the better. But I shall not moralise, or read you homilies. There is hardly time for that in these rushing times, though the necessity exist.

The changes in bee-culture have doubtless been greater during the past fifty years than during the previous five thousand years. From the time long ago when the bees (so we are told) made a hive out of the anatomy of a dead lion, and Samson robbed them of their honey without smoker or extractor, there has been considerable change and improvement not only on that particular style of hive, but in a good many other bee-keeping appliances. But if Samson had no smoker or "bee-escapes," or other new fangled affairs of that kind, wherewith to circumvent those primitive bees, he had, it seems, plenty of strength, if that would avail him anything in a contest of that sort. At any rate he got the honey in some way out of the carcass of that dead lion, which he had rent and slain a short time before. And Samson did eat of the honey, we are told, which is just what we would do ourselves under the circumstances were the hive of modern make and the contents therefore more toothsome.

But although he was a hearty man and evidently not at all fastidious, Samson was not able to eat all the honey he got, for he took some away to his father and mother and they did eat. He also, no doubt, (though the account does not say so) took some to his affianced, for remember Samson was on his way to get a wife when he found that honey in the dead lion.

There has been, of course, great improvement in our methods and appliances since that time ; and from that day to this, there has been a general and pretty keen taste in mankind (and womankind) for the sweet nectar of flowers, which when gathered by the bees, half digested in transit, and stored in the comb, we call honey. This is one of the good appetites which man has ever since retained ; while he has in the interval gathered up many bad ones. It is not necessary for me to say much here, further than to give you some account of my official work during the year, and of how I have carried out your behests delivered to me a year ago ; as we have several papers forthcoming at this

meeting on important, and some of them, burning questions, which will no doubt be discussed with energy, and I hope profit, and at as great length as time (which waits for no man) may permit.

I shall, therefore, hasten through with business proper after first merely congratulating you on a fairly prosperous and successful honey season throughout the Province.

As most of you are aware, our principal work as an organisation the past year, as of the previous one, has been the continued warfare against the foul brood pest. A year ago we hoped that another year of fighting would about vanquish the enemy in this Province. But our anticipations have not been realised; not owing, I think, to lack of energy or ability in prosecuting the work, but owing to the wider prevalence of the disease than we supposed, and also to the failure of some bee-keepers to properly co-operate with the inspectors in their efforts to have the disease cured whenever possible instead of destroying the colonies. In addition to those obstacles the Government grant, though larger by one third than that of the previous year, was insufficient to keep both inspectors at work the whole season. As it was, the grant was considerably exceeded; and although the Minister of Agriculture protested against this and complained to me that the inspectors had been allowed to exceed the grant, he nevertheless, paid both their accounts in full. The Minister cannot be blamed for this protest as the grant was increased to the amount we suggested.

On my return from the St. Catharines meeting I called on the Minister, and in accordance with the sense of the meeting, laid the matter before him, asking an increase to $600. This the Minister assented to, and it was done, but the amount still proved insufficient. In the face of the urgent calls for the services of the inspectors and the pressing necessities of the case, I did not feel warranted in calling them off in the middle of their work when the end of the grant was reached, especially as the deficit the previous year had been met by the Government without protest. I would, however, take the liberty here of suggesting to my successor in office and to the inspectors the coming year, the inadvisability of exceeding the grant whatever it may be—the protest from the Department against such a course being now before us.

I need not go into details of the work done under the Act the past year, as the inspector's report will set that forth. So far as I know the Inspectors have performed their duty faithfully and well. Instead of destroying the colonies, they cure the disease, though not perhaps *secundum artem.* But whether scientifically done or not the disease seems to yield to their treatment, and the victim who thus gets rid of it will not be likely to bother his head about this theory or that, scientific or otherwise. The questions as to whether the worker bees become constitutionally affected with the disease and transmit it to the larvæ; and whether the queens may be similarly affected and transmit it through the egg; and whether the wax rendered from contaminated combs may in "foundation" become a cause of the disease; and whether the spores of *bacillus alvei* carried by the air from hive to hive may also cause it,—these are questions which are still unsettled and indeed in hot dispute. This is clearly a case (not common) of theory and supposed scientific facts (real or not as the case may be) clashing with the facts of experience—not narrow and isolated experience; but wide and accumulated experience. The real facts on both sides will of course remain, while the untenable hypotheses and speculations must ultimately give way. I can easily conceive how both sides to the controversy may be both right and wrong—that is, the scientist may be perfectly right when he tells us he sees under his microscope the disease germs in the adult worker and queen; and he may be wrong in his theory or conclusion that such contaminated worker or queen transmits the disease to the larvæ or through the egg. On the other hand "the party of the other part" may be quite right practically in their treatment founded on the assumption that the honey is the chief if not the only medium of spreading the disease; and in claiming that such treatment, in their hands, always cures; and they may be wrong in their denial that the mature worker and queen may be constitutionally diseased with foul-brood, and that the disease is never spread in that way.

My advice to both sides would be to stick to, and hold on like ticks, to the facts—the real facts—but be careful about the theories not proven, and avoid dogmatism. I

would also advise all who have to deal with the disease to stick steadfastly to the plan of treatment that cures, no matter what it is, and no matter what theory butts up against it.

Our English apiarian brethren look with the utmost incredulity, if not contempt, on the methods of cure practised so successfully by our inspectors and others on this side of the Atlantic, and to a great extent refuse on theoretical grounds to test them, while we think their methods very queer if not ridiculous—proceeding, as they do, to treat the disease deductively, *secundum artem*. The only reason that our people don't try their methods is that by their own methods they can cure successfully, and what more do they want? Were it otherwise they would be glad to receive suggestions from any quarter. The difference between us seems to be just this. They adopt plans of treatment to fit the theories—right or wrong—which they hold about the disease, while our foul-brood doctors pay but little attention to the theory or science of the matter, but adopt the treatment that cures. As to which is the wiser course of the two, people who are not bothered themselves with foul-brood will differ in opinion, but I fancy there will be but little difference of opinion on the subject among those who are afflicted with the pest and wish to get rid of it with all the speed possible. Meanwhile, we cannot study the whole subject too deeply or too attentively in order to get to the bottom of it in both theory and practice.

At the last annual meeting of this Association I was instructed by resolution to communicate with the Director of the Experimental Farm at Ottawa and the President of the Ontario Agricultural College at Guelph, and ask them, on behalf of this Association, to have the necessary experiments made to determine whether the disease of foul-brood may be spread by the use of comb foundation from wax made of combs contaminated with the disease. In accordance with this, I first placed the matter before Prof. Saunders, and Prof. Shutt, the chemist of the Experimental Farm, showing them what we desired done in the premises—the main point of which was to determine by experiment the degree of heat necessary to destroy the vitality of the spores of *bacillus alvei*—the foul brood microbe—and whether the degree adequate to the rendering of wax was sufficient. Both gentlemen professed their willingness to render us this service were it in their power, but unfortunately they had not at their command the special scientific apparatus necessary for the work.

I then applied to President Mills of the O. A. C. at Guelph, and here is his reply :

"Dear Sir,—In answer to your letter *re* foul brood in bee-hives, I beg to state that our professor of natural history would be very glad indeed to conduct the experiments necessary to determine the degree of heat required to destroy the *bacillus alvei*, but we are like our friends at Ottawa, we have not the special apparatus necessary for such work.

I think the most likely place to get the test properly made is Prof. Ramsay Wright's Biological Laboratory, Toronto. I would suggest that you write to Prof. Wright.

Regretting our inability to do the work, I am

Very truly yours,

Allen Pringle, Esq.,
Selby P. O., Ont.

Jas. Mills."

In accordance with President Mills' suggestion, I wrote Prof. Ramsay Wright of the University, Toronto, laying the whole matter before him, and asking his friendly services in the matter, I am glad to say, with success, as the following letter from the professor will show :

"University of Toronto, Dec. 31st '91.

Allen Pringle, Esq.,
Selby, Ont.

Dear Sir,—Referring to your letter of the 29th inst., I take pleasure in saying that I shall be glad to be of assistance to the Association you represent, in settling the point in question.

I should require 1st to know the method adopted for converting the old combs into comb-foundation, so as to get at the temperature employed; 2nd to have some foul brood material from which to prepare cultures, and to test the vitality of the spores.

Mr. Cheyne makes no remark in his original paper on the subject on the resistance of the spores.

Awaiting your further communications on the subject, I am

Yours faithfully,

R. Ramsay Wright."

In response to this, I have advised Prof. Wright that as soon in the spring as a sample of the foul brood material can be procured, it, with the information he requires, will be sent him. This Association will, therefore, no doubt in due time be in possession of the desired information on this important point.

The president, vice-president and James E. Frith were appointed a committee, a year ago at St. Catharines, "to consider the danger of the introduction of foul brood into Canada from the importation of bees, and if found desirable, to take such steps as will insure the protection of bee-keepers through quarantining imported bees when deemed necessary."

After communicating with the other two members of the committee, I proceeded to carry out the intention of the above. I put myself in communication with the Dominion Minister of Agriculture in reference to the matter, but for some reason or other could get nothing more in response than an acknowledgment of the receipt of my letters. This was probably owing to the topsy-turvy turmoil and confusion which reigned in official and parliamentary circles at Ottawa during nearly the whole of the last session, and especially at the time in the early summer when I addressed the Department of Agriculture. Under the circumstances the only course open to me in order to accomplish this work was to proceed to Ottawa, which I did, hoping to kill two birds at once by attending to the matter in question, and also the other matter of foul brood experiments with Prof. Saunders.

The result as to the former was all we could desire. After laying the whole matter before the Hon. John Carling, Minister of Agriculture, and Mr. John Lowe, Deputy Minister, it was decided that an order in Council would meet our case instead of an amendment to the Contagious Diseases Act. These gentlemen assured me that they would procure the passage of such order in Council whenever the Ontario Bee-keepers' Association or its representative deemed it necessary, and communicated the fact to them —at the same time instructing them definitely as to what was wanted in the matter of checking the importation of bees, etc., or prohibiting them altogether, or quarantining them. This is all we could ask or expect, and the Association now stands in a position to protect itself and Canadian bee-keepers from that danger whenever necessary. I think I may safely say that this Association will take no unfriendly action against our neighbors across the lakes. Whatever may be done will be done solely as a necessity in the direction of self preservation and self-protection.

I was also sent by this society last year as your delegate to the Central Farmers' Institute, whose annual meeting in Toronto in February last I accordingly attended. I prepared and read a paper there on "Bee Culture in Ontario," for which your delegate received a hearty vote of thanks from the convention. Your delegate was also deluged with a lot of questions at the conclusion of the paper, on this and that in bee-culture. These he endeavoured to answer to the full satisfaction of the meeting, which manifested a lively interest in our favorite pursuit.

On retiring from a second term of office as president of this society, I may say that I have faithfully endeavoured to perform its duties one and all, and I hope to your satisfaction. I thank you for the honor you forced upon me against my inclinations, and for the uniform kindness, courtesy, consideration and good feeling shown towards me personally at all times by you all.

BEE CULTURE IN ONTARIO.

The following is the paper referred to in the President's address: My business here is to represent the Ontario Bee Keepers' Association as their delegate to this farmers' convention. Were I merely an apiarian specialist I might feel a little out of place here, but being a farmer as well, and a working one, I ought to feel at home amongst farmers. I shall not, however, on that account take advantage of the occasion to bore you with a long essay.

The Ontario Bee Keepers' Association is a legally incorporated body with a member-

ship ranging from three to four hundred, and has a number of local societies in affiliation, to each one of which the parent society makes an annual grant for the encouragement and promotion of the industry. The bee keepers of Ontario number some tens of thousands, and they produce annually nearly half a million pounds of honey. This province of Ontario in its honey yielding capabilities, as in many other respects, stands second to none in the world. Nor is apiculture in Ontario, either as a science or art, behind that of any other country. My own opinion is that she takes the lead in taxing the "busy little bee" for all it is worth—the same as she herself is taxed for more than she is worth, or at any rate more than she can pay and live decently.

The most formidable enemy bee-culture has to-day to contend with throughout the world is the disease known as foul-brood, caused like so many human diseases, as science has disclosed, by a microbe which destroys the young brood. Ontario, I may say, has taken the lead of other countries in wise measures and vigorous action for the extermination of this pest, as we have now in our provincial statutes an "Act for the suppression of foul brood among bees," recently passed, which is, without doubt, the best of its kind in the world. Under its provisions we shall be able speedily to overcome this greatest enemy to bee-culture.

In this as well as in other directions the Ontario Bee-Keepers' Association is doing a most useful work in developing bee-culture in this province, thus placing on our tables a wholesome, palatable, and cheap food—not merely a luxury, for there is more nutriment in 1 lb. of honey than in 5 lb. of fat pork. Our Association is also doing its part in upholding the credit of Canada abroad as a producer. At the Indian and Colonial Exhibition held in London three or four years ago Ontario bee-keepers exhibited many tons of the finest honey in the world and took the palm in the public eye and popular taste against all competitors. Our fields and forests yield abundantly of the choicest nectar nature produces anywhere.

I have always thought that bee culture was a proper and legitimate part of agriculture, and, consistently with that opinion, I have always kept bees on the farm, and am, therefore, very well acquainted with the little insects through an experience of a quarter of a century. My stock of bees from year to year has ranged from ten to one hundred and fifty colonies, and my crop of honey from one hundred to ten thousand pounds. The bees I regard as a part of the live stock and bee-culture a proper part of farm work, and I may say, with me, the most profitable part. I do not mean by this to advise every other farmer to go largely into bee-culture. While the great majority of them might keep a few colonies to advantage to supply their tables with the most wholesome and palatable sweet, only the comparative few can handle the bee successfully and profitably. Indeed, amongst the small bee keepers of "old box-hive" fashion it seems to be just the other way, the bees handle the man instead of the man the bees. They do about as they like and more than the manipulator likes sometimes.

Although the bee is a highly interesting and industrious creature and fairly peaceable, yet it always means business, and has a bumptious "business end" always ready to present to interlopers on very short notice.

But the honey bee performs an invaluable service in the economy of nature besides gathering honey for us. For this, if for no other reason, every square league of settled land in Canada ought to embrace within its area at least a few colonies of bees, else the clover seed and fruit crops must fall far behind what they might be.

I need scarcely say to you that the bee carries the fertilising and fructifying pollen from flower to flower in our orchards, gardens and clover fields, thus securing a fruition of fruit in the one, and an abundance of seed in the other. This most important function and service of the honey bee is not duly appreciated. Between apiculture and horticulture especially, there is a close and indispensable connection, and the apiculturist, horticulturist, and agriculturist ought to work hand in hand as being mutually useful to and dependent on each other.

Horticulture, our nearest industrial kin, is, I believe, well represented here to-day, and I am pleased to say that the misunderstandings and differences which have some-

times arisen between us as to the alleged injury done to grapes and other ripe fruits by the bees are fast passing away. It has been satisfactorily proved, and is now very generally understood by the fruit growers, that bees do not puncture or injure sound fruit, whether mature or immature. The bee will, it is true, sip the oosing sweets from a broken grape, peach or pear, but never punctures or injures in any way sound fruit, while the benefit the bee brings to the fruit grower in fertilising his blooming trees and vines, he would be better able to estimate were the service withdrawn. Indeed, he has found it necessary when growing exclusively under glass when the bees were shut out to introduce them or fail his crop. Thus it is that the bee keeper and the fruit grower are mutually beneficial to each other, and ought, therefore, to understand and appreciate each other better than they do.

There is also, unfortunately, here and there, a prejudice in the mind of the farmer against the bee, which is equally unfounded and ought to be removed. Instead of realising the great service it renders him apart from the honey it gathers, he charges that that field of buckwheat of his will not yield so much grain after the bees have "sucked the flowers," as he calls it, but he is greatly mistaken. He has more grain instead of less. Let him get to the leeward side of his buckwheat patch on any fine morning when it is in bloom and his sense of smell ought to convince him without any scientific argument that the nectar of his blooming buckwheat or clover is rapidly escaping into the air by evaporation. "Instead of wasting its sweetness" thus, why not let the busy bee take it up for our pleasure and profit, and fertilise the flowers at the same time? For twenty years past I have been in the habit of sowing buckwheat every season at several different times, partly for the bees and partly for the crop, and I almost always have a crop of grain as well as honey from each sowing. The notion is general that in order to get a crop of buckwheat the seeding must be done about the end of June or first of July. I sow my first lot about the end of May, the second some three weeks later, and so on till August, each sowing usually producing a fair crop of grain, and some a superabundant crop. The last sowing is, of course, sometimes caught in bloom by the fall frost, but in that case it can be immediately plowed under for manure, and nothing is lost. I am well aware that in parts of Ontario buckwheat is in bad repute among the farmers, and almost unknown. Nevertheless, it is all the same, a good and profitable crop. Three years ago when that terrible drouth in the east scorched up other kinds of grain, many farmers in Prince Edward and other counties "saved their bacon," not this time for buckwheat but with buckwheat. In desperation they plowed up their scorched fields of grain—or rather no grain—and sowed to buckwheat. The rains came at last, and they reaped thousands and thousands of bushels of the despised and abused buckwheat—all the crop they had, in fact. I am a friend of the buckwheat every time. No farmer who understands his business need be troubled with that bugaboo of "after-seeding" as it is called. I may say here to those who have not tried it, that the Japanese variety of buckwheat is by far the best of any; and next comes the silver-hull. The former is a much larger grain, more productive, and better in every respect than the common kinds. When I took some of it to mill for cakes the miller complained that it would not go through his buckwheat sieves on account of its enormous size and wanted to know where on earth I got it. And the cakes it makes, spread over with honey instead of being soaked with pork gravy, are fit for gods or men, and angels or women, (which perhaps mean about the same thing). But this is a disgression—a pertinent one, however, for buckwheat, like the fruit tree and clover plant, yields a double crop—one of honey and one of grain.

In conclusion, I may draw attention to one other fact from the economic standpoint in favor of bee-culture as an important branch of agriculture. Every bushel of grain and pound of meat which we raise and sell off the farm represent and carry away with them a certain amount more or less of our agrarian capital, or, in other words, the fertility of our soil. Not so much with the sweet nectar of the flowers, which would be mostly wasted in the air were it not ingathered by the bees. When you sell 20 bushels of barley for $10 (and you can hardly get that unremunerative price for it) along with the barley you part with certain of your soil elements, which means more or less impoverishment of

your land; but when I sell 100 lb. of honey for $10 the transaction involves no corresponding impoverishment—that is, I have saved and gathered what would have been otherwise practically lost. I am, therefore, a more profitable producer of wealth in the body politic and the body industrial than either the agriculturist proper, the horticulturist, or the stock-raiser. This economic fact, together with that other fact, that pure honey is the most palatable and wholesome sweet made in the whole laboratory of nature or art, ought to place apiculture in equal rank with, if not ahead of, every other branch of agriculture.

Moved by Mr. HODGINS, seconded by Mr. HAYCOCK, that a vote of thanks be tendered to Mr. Pringle for his excellent paper on bee culture. Carried.

The PRESIDENT—What has been your average income from sales of honey and bees per year from say 20 colonies?

Mr. PRINGLE.—My average returns per colony for a number of years by spring count, by that we mean in the spring before they begin to swarm, has been about 50 lb. I have taken 100 lb. per colony, but on the average about 50 lb. At 10 cents that means $5 worth of honey.

Mr. KENNEDY.—What kind of bees do you keep?

Mr. PRINGLE.—I have kept the different races of bees for some years. First I kept the native bee, the brown or German bee, which is the usual bee kept in this province. It cannot reach the nectar in the red clover except in a very dry season when the heads are small. I have tried the Italians and they can reach it unless the heads are very large, their tongues being longer. I know of no other bee that would do as well as the Italian. I may say that during the last two or three years the honey product of Ontario has been quite a failure, as it has been throughout many parts of the world. The secretion of honey in the flower requires a certain temperature, and if it is too dry or too wet it is equally unfavorable, and on account of the partial failure for the last two or three years the price has been a little higher than usual. There is a very erroneous impression in the public mind with regard to feeding sugar to bees for the purpose of making honey. Bees can be wintered on sugar syrup successfully, but we don't feed sugar to produce honey because we cannot get honey by feeding sugar to the bees, they cannot manufacture sugar into honey. While sugar and honey are nearly the same there is the difference that one is the nectar of flowers and the other is just sugar. We can feed syrup from No. 1 sugar to winter them on and they will winter successfully on that, and it is often done by the best bee-keepers in the province, because we find our stocks sometimes short, and we have to carry them through, but the better way is to leave enough honey with them. I am not in favor of feeding sugar at all, but if they are falling short it is better to feed them sugar syrup than to feed them bad honey. I think if you take the trouble and expense of feeding sugar altogether into account I don't think it is profitable to take away the honey and winter your bees on sugar, as you can winter them successfully on buckwheat honey that is not worth quite as much as the light grades of honey. I winter my bees almost every winter on buckwheat honey and I find it is a good winter store. Some people think it is not as good as the light honey but my experience is the contrary, it makes perfectly wholesome winter food. As to the adulteration of honey, some nine years ago a professor of science in the States made the assertion in the *Popular Science Monthly* that comb-honey was manufactured; that the comb was first made by machinery and then filled in, the whole thing being done without the meditation of the bees at all. That gentleman has done more harm to the industry throughout the world than any other slander that has ever been uttered. It was copied in the magazines all over the country and the people who did not understand the matter believed him. The fact is there has never yet been a pound of comb-honey manufactured; it is beyond the art of man to do it. A year ago last fall the editor of the *Popular Science Monthly* found out for the first time that slander in his magazine had done our industry great harm and wrote to me asking me to correct it. I did so through his own paper, challenging the statement, and we have heard nothing from the professor since. We offered $1,000 to any man that would bring forward one pound of this manufactured honey or tell us

where it could be had, and I myself offered 100 colonies of bees, but they have never come to claim my bees or the money, because the thing cannot be done. In regard to wintering bees my opinion is that the cellar for the common farmer who keeps a few stocks is the best place if it is fairly dry. I can winter mine outside on the summer stands by properly packing but I would not advise any one inexperienced in bees to attempt them outside. I generally winter my bees in my cellar, where I pack 100 or 150 colonies in together and my average loss is from 2 to 5 per cent.

The meeting then adjourned until 7.15 p.m.

FIRST DAY—EVENING SESSION.

The meeting was called to order at 7.15, when the President's address was taken up. The matter of quarantining bees was first discussed.

Mr. W. F. Clark would prohibit the importation of bees by the pound, but wanted to be able to get queens in colonies when he desired.

Mr. Jas. Frith said that the importation of bees by the pound was the cause of his losing one hundred and twenty colonies by foul brood. He thought that bees should be quarantined.

Mr. McKnight thought that quarantining bees would be impracticable.

The thanks of the meeting was tendered the President for his address.

HIVES AND WINTERING.

Mr. D. Chalmers read the following paper :

In presenting a paper on this subject it is not my intention to try to determine any particular style of hive, but will dwell more particularly on the requisites in and about a properly constructed bee domicile.

The first thing to be considered is the capacity of a hive. It is very generally conceded that that has been carefully tested and properly demonstrated years ago by such men as Father Langstroth, the lamented Moses Quinby and others, when they placed the area of the brood chamber at about 2,000 cubic inches. That estimate, however, allowed the bees passage ways between the ends of frames and the interior of the hive, a feature which weighs heavily against open-end frames. Take for instance a hive of closed-end frames, which will give you as much comb space as an open-end frame would, and what do we find? We find that a hive twelve inches wide and twelve inches deep made for the former would not require to be as large by fully one hundred cubic inches, as a hive made for the latter.

Although I do not use closed-end frames myself, yet I have a strong inclination to believe that better results could be obtained from them than from open-end frames. Those blank one hundred cubic inches before specified may well be classed amongst the leakages of the hive, and who can dispute the fact that the greater the leakages the more will brooding be retarded.

In the use of open-end frames the loss in this way will be less in a long frame than in a short one; but another evil here crops up, that is the sagging of such when filled if not made of heavier material, and if sagging takes place you all know that passageways under the frames will be contracted while those above will be widened, the latter evil inducing the bees to build comb where not wanted, while in the former the comb frames will be glued down solid.

To my mind a hive of proportionate dimensions would be $13\frac{3}{4}$ inches long by $12\frac{1}{8}$ inches wide and 12 inches deep. This gives you a hive containing 2,000 cubic inches; but shorten this hive three-quarters of an inch to suit closed-end frames with equal comb

space and we get a hive which we might term Anno Domini, 1892, as that is the number of cubic inches it would contain. But while many besides myself favor a hive of this description, others again advocate a much longer and considerably shallower hive. However we should all aim at getting a hive at just the right capacity; and taking it for granted that the previous figures are correct or nearly so for a hive for brooding and wintering purposes, yet we have to admit that there is not room enough in it for a strong colony of bees during the honey harvest. We then have to resort to tiering-up, as bee men term it, or in other words place another hive above or a case of section boxes; this is where we get our surplus. The former is used if we purpose extracting, but if honey is wanted in the comb then the latter is more convenient. In either case the top of the lower frames must be at some distance from the bottom of the upper frames or sections, otherwise the bees would glue the one to the other.

We should aim, too, at bringing such parts of the interior as closely together as circumstances will permit. Wherever passageways must of necessity be left between any two parts of a hive they should not be less than a quarter of an inch, nor exceed five-sixteenths in depth, or we would have to contend with evils hereinbefore pictured. Such passageways we term bee spaces.

Between the lower and upper frames or super we find a double and sometimes a triple bee space. The apiarist has had to do battle in trying to confine the queen or mother bee to the brood chamber and yet allow the honey gatherers to pass to the combs above. This fight, however, has been reduced to a mere minimum since Mr. D. A. Jones, of Beeton, applied zinc so accurately punched with oblong holes that the queen is put at defiance, her shoulders being of somewhat larger porportions than that of the workers. The use of this zinc over the brood-chamber is wherein it becomes necessary to leave a double bee space, and any contrivance there which causes the queen to halt is termed queen excluders.

During the past summer I devised a mode of using this zinc, which I consider the most practicable form yet introduced, which is to cut it into narrow strips not exceeding four inches and long enough to cover the hive crossways of frames. Five-sixteenths of an inch on one edge of those is bent to a right angle to rest on the comb frames, the top of which should be just bee space below the level of top of hive; the flat edge of first piece of said pieces rests on edge of hive, and each succeeding piece rests on the one previously placed, until the last is reached, when it is reversed and is supported same as the first one. By using this zinc in some such manner the upper frames are within two bee spaces of the lower ones, while by using it by the Heddon-Tinker plan they are three bee spaces apart A bee space in the hive I use contains fully fifty cubic inches, while in the Langstroth it is about seventy, which means that amount of space to be filled with bees for nothing, as there is not, or at least should not be any comb there. It is also very desirable for comb honey producers to have well devised supers.

A matter of not a little importance in a bee hive is to have the comb frames spaced to a proper distance apart; they can, we confess, be spaced considerably wider in the surplus hives than in the brood chamber; in the latter one and fifteen-sixteenths of an inch from centre to centre is sufficient while in the former 1½ inches is not too much. Care needs to be used in suspending the frames to have as small a portion of them touch the hive as possible. All hives require a bee entrance at the bottom and a board or other covering. This brings us to the exterior of the hive where there is nothing very material to note other than if the hive has to stand the weather it is better to be well painted, but if protected by an outer case it is better without paint and costs that much less. I feel convinced that a colony of bees will winter better in an unpainted than a painted hive.

This brings me to the second part of my paper—wintering. On this subject I will be brief, and as I have discarded cellar or indoor wintering, I have concluded to merely describe the clamp I use. It is built to accommodate two hives deep in summer, while in winter it affords three inches of packing under the hive, four inches around and as much as you wish above. The bottom fits inside to allow the sides to run the wet over, the siding lies horizontally, the joints are bevelled or shiplapped, it is shanty roofed and the roof is

shingled. The siding for front and back is nailed to two narrow strips, said strips don't quite extend to the bottom nor top. When the clamp is constructed they stand on the bottom, while they require to be short of reaching the top to allow the rafters a rest inside. By using strips in the corners the clamp is much stronger and no care need be used to break joints, and should you wish to knock them down for summer there would not be so many pieces, but it is quite unnecessary to do so, as no better sunshade could be provided. There are three boards in each bottom. The two outer ones are nailed to two strips for the hive to rest on, while the centre board is left loose to be removed in summer to allow a current of air to pass through the clamp. The front of roof requires to be raised a little, too, to give sufficient ventilation. There are just two rafters which are fitted inside of ends to hold the roof in place. A board of proper width is placed between the interior of clamp and front of hive to allow the bees an opening through the packing. This board is nailed to two bevelled pieces which forms the end of entrance ; there are two tin slides with a hole punched in each to afford a catch in opening or contracting the entrance.

Before placing the hive the clamp is filled to level of bottom pieces with ashes, cork-dust, chaff or other packing, and when the hive and entrance fixtures are in position fill in all around with packing, but not over the top until you see that provision is made for the moisture to escape through the covering of hive. I thank you for your attention, and trust my explanations have been sufficiently explicit and of benefit to you.

Mr. McKnight thought that bees wintered better in separate clamps than where a number of hives were together, as where he had wintered separate the result from the colonies was much better.

Mr. Duncan thought that when bees were set out from clamps with a number of colonies in one the bees would get confused and perhaps get in the wrong hives and cause a loss.

Mr. McEvoy was asked what his experience was in regard to a very strong hive or a second or third swarm for wintering. He claimed the best results was from strong colonies.

Mr. McKnight claimed that he got the best results from the second or third swarm.

Mr. L. Travers thought bees wintered in clamps with a number of colonies in as well as in single clamps.

Mr. Picket thought that bees would intermingle after being set out of the cellar in spring unless set out quietly from the cellar. He generally set his out at night.

Mr. McKnight asked why bees wintered better on the top rows when wintered in the cellar.

The general impression was that it was drier at the top of the cellar than at the bottom, which was favorable to wintering successfully.

SECOND DAY.—MORNING SESSION.

The President took the chair at 9.30 o'clock and called the meeting to order.

APIARIAN EXHIBITS.

Mr. R. H. Smith, of Bracebridge, read the following paper :

During the past ten years bee-keeping as a specialty or side issue has very much increased in many parts of the Dominion, owing as much to increased knowledge of the subject as its attraction as a health-giving pursuit. It has a fascination peculiar to itself, that few lovers of the busy little insect can resist. Bee-keepers have awakened to the fact that they have a good thing and that it should be in every household not to be used only as a luxury or medicine, but to take the place of less healthful syrups, etc.

Honey, although seen in most groceries, is not understood or used so extensively as it ought to be. Now, how to educate the public as to the nature and uses of honey is clearly the duty of the bee-keeper if he wishes his honey to find a ready market. One way of doing this is by fitting exhibits of his goods. But where is he to exhibit? In the first place, I should say at home—in the honey room, or if more convenient, in the house. Let one spot be devoted to an exhibit of honey—comb honey—extracted honey, beeswax in small cakes, etc., and to every customer let him give some instruction in the science. All may not appreciate, all may not understand, but some will.

After straightening up the exhibit and taking a complacent look at it, a customer comes, it may be a small boy accompanied by a few sisters, who wants five cents' worth of honey because the baby has got a sore mouth. He asks a few questions not always to the point, but as you answer you can set him right as to how the bees get the honey into the holes, and as to whether they made the boxes. The next time he asks more questions and makes no secret of the knowledge he has acquired. Set him right every time. He will understand you bye-and-bye, especially if the answers are illustrated by a taste of the honey. A little bit of capping or a small piece of broken comb will enlighten him wonderfully, and when he has a house of his own he will see that honey is used in it and some bee-keeper will have to supply it.

A lady comes for a pail of honey. Show her your samples; tell her how you get the different kinds of honey; extract a comb before her. Likely she will want to turn the handle of the extractor. Explain granulation; show her the sun wax extractor, etc. She will go away a friend to you and a customer in the future.

Let the home exhibit be supplemented by the grocery exhibit. By fair dealing and neat and not sticky packages, you can get a place in the grocer's best window, and in a prominent place in the store put up the honey so that it is a credit to you, and in a way that will attract notice among the other goods.

On special days make special exhibits with a frame of bees in an observatory hive in the window, with a few special notices to draw attention to them. One who knows all about bees explains to his friends what the bees are doing, sometimes startling statements are made, but an interest is aroused, honey is sold and some knowledge spread.

Then there are the local fairs when the bee-keeper shows his wares in their holiday attire, put in packages to suit every customer. Many can remember the time when the apiarian department was represented by two or three bottles of strained honey and a box or two of comb which were perhaps mixed up with the miscellaneous products of the farm and passed with little notice, but of late years bee-keepers have taken more interest in the management of fairs, and have seen that their products were properly classed.

The managers of these fairs see that it is to their interest to help the bee-keeper by giving him a good stand and making things convenient for him generally. The well put up displays reflect credit on them, and it is a decided contrast to much that is there.

Honey can be sold at fairs to those who would never see or taste it but for this occasion, and once tasted and told where it can be had they often avail themselves of the chance of getting a supply. Cull sections disappear like magic here in the much discussed honey on a stick form, the only comment being general approval.

Emboldened by success at home the bee-keeper tries abroad, it may be at the great Industrial or Provincial Exhibitions. Not that he expects to take prizes. Oh, no. But only to see how his honey compares with others. A modest third is the highest he aspires to.

Then again we have at our large exhibitions displays of honey and bee-keepers' supplies that create the wonder and astonishment of visitors, not only of our own people but visitors from Great Britain and the United States, and the visitor will stop and ask questions and perhaps purchase.

One skeptical visitor to Toronto Fair pointing to my exhibit put the question to me: "Did this honey come from Muskoka?" I replied that it did. "Now, did it really?" he repeated. I again assure him that it certainly was gathered there by bees, and that it was as good a district for honey as any part of the province. "Well, now," he exclaimed, "I thought it was too rough." But after I had explained that the uneven surface was no disadvantage, that we had a succession of bloom beginning with the many varieties of willow in the early spring, followed by the soft and hard maples, elm, dandelion, cherries, apple, berry bushes of various kinds, clovers, lindens and the numerous fall flowers, how the bloom on the high ground gave honey in wet seasons and low ground in dry seasons, he went away with a better opinion of Muskoka.

Not only do the people get enlightened as to the sources from which honey is derived, the mode of harvesting, its granulation and manner of liquifying, but bee-keepers themselves are likely to be benefited. Each sees what the other has done, and the practical eyes are open to all improvements. They will compare notes as to experiments with different implements and inventions, and will hear how others succeed with them; also what the yields of honey have been in different sections of the country, and will discuss as to what are the favourable conditions for good crops and how far they can be controlled and made the most of, giving ideas for future thought and discussion. Therefore apiarian exhibits are a benefit to the bee-keeper and one of the best means of educating the general public.

REPORTS OF AFFILIATED SOCIETIES.

There have been eight societies in affiliation this year, being the Bruce, Listowel, Lambton, Middlesex, Oxford, Brant, Haldimand and Norfolk. These societies, excepting the last two mentioned, have sent in reports.

The six reported have a total membership of one hundred and thirty-eight, the number of colonies 3,648 in fall, 2,982 in spring; an increase of 22 per cent. The production of comb honey was 16, 47 lb., or an average of about 5½ lb., and of extracted honey 86,567 lb, or an average of 29 lb. per colony. If we compare these reports with last year we will find that there is very little difference in the average production of honey last season, the amounts then being 5½ lb. comb and 26 lb. extracted. There has not been as great an increase in bees as last year, it being about 22 per cent. to 42 per cent. last season.

The grants given to these societies have been partly expended in prizes, etc., at agricultural fairs and for lectures, but in some cases the societies hold quite a balance which will likely be partly paid out this winter for lectures.

The matter of grants from the Ontario Bee-keepers' Association to affiliated societies and how they should be expended was discussed. It was decided that by-law No. 14 should be amended so as to permit of affiliated societies to apply a part or whole of their grant from the O. B. K. A. in the distribution of apiarian literature or in sending delegates to the Provincial Association meetings.

REPORTS OF DIRECTORS OF DISTRICTS.

No. 1. Owing to the fact of no district association being as yet formed in my section of country, it is almost impossible to form an estimate of the number of colonies or the yield of honey. But so far as can be ascertained from the bee-keepers that I have been in coversation with it appears to have been an extra good season for clover honey, but very little from any other source. From forty-five colonies spring count my increase has been fifteen, and my yield of extracted honey has been 3,000 lb., an average of nearly 67 lb. per colony; but there are others who have done much better than that.

No. 4. The past season has been far below the average in the production of honey. The northern portion of Prince Edward county and the southern portions of Hastings and Lennox and Addington were notably affected by severe drouth. In localities most affected by drouth bees scarcely made a living until 8th August when there followed a flow from buckwheat which lasted until 27th August. During this time colonies built up strong for winter, and yielded a surplus of about 40 lb. from strong colonies, while bees in the northern portions of the latter counties and southern portion of the former county gave a surplus of about 50 lb. of white extracted honey or its equivalent in comb honey. In localities that gave the best yields of white honey there were but small quantities of buckwheat sown, therefore not much dark honey. The season was too dry and cold for the secretion of nectar. Natural increase about 20 per cent.

No. 6. Bees came out of winter quarters in fairly good condition and continued so until honey was to be gathered, that being about the 10th May, and from the golden willow which generally yields sufficient to keep breeding up until fruit bloom. Fruit bloom only yielded fair, but there was not any feeding necessary to keep up the store until clover began to yield. Clover bloomed abundantly and for a week or so yielded plentifully, but owing to drouth the bloom was cut off and consequently the amount of clover honey secured was not as great as was expected at the beginning of the bloom. Basswood and thistle yielded only a small amount, and as clover, basswood and thistle are what the surplus honey is got from in this district the average production has not been large. I think from 45 to 50 lb. would be about an average from fairly good stocks. As there is little or no fall pasture in this locality it is necessary to have a good store of honey in the hives for winter. Bees consumed a large amount of honey in the fall, as the weather continued fine and warm, and in some cases where care was not taken to leave plenty of honey in, feeding had to be done to have plenty of winter stores. As far as known bees went into winter quarters in fairly good condition.

No. 8. In this county (Haldimand), owing to dry weather, the yield was very light —about 15 lb. per colony. Of this about two-thirds was clover honey, which was extra quality. There has been practically no increase in the number of colonies over last year. I cannot give yield per colony in the counties of Monck and Welland, but it is very light. Can give no report for Lincoln.

No. 11. This is a very large district and it is almost an impossibility for a person to cover the whole ground and visit every bee-keeper. However, I have been over a portion of the district, and had reports from friends and from associations that will form a basis for a report; but I find it a very hard matter to get the information necessary from the bee-keepers. A great many are very reticent in this matter. Double postal cards, placed in their hands through the mail ready for filling out and dropping in the post office, will not in many cases be attended to. I would advise that the district be divided and another representative added.

The honey season of 1891 has been a fairly good one in this part of Ontario. Bees came out in good condition in spring. Fruit bloom was early and abundant. The air was chilly in early spring and some complain of loss by spring dwindling. However, these were not in the majority. The honey flow for a time was good, and as the pasturage here is largely clover and basswood there was much honey taken when these were in bloom. The counties of Middlesex and Perth have had a fairly good yield, and judging by reports from all sides I should say that 50 lb. per colony would be about the average amount taken. The swarming fever has not been so prevalent this year as usual, not so much increase is reported and more honey has been taken.

In that portion of the district around Lucan, Elginfield and Plover's Mills, considerable honey dew is reported, and samples shown at the late convention in Lucan (Dec. 18th, 1891), are dark in color, having an unpleasant odor and a rank taste. But in the larger portion of the district this honey has been of superior quality, being of good consistency and excellent color. We also notice that not so many "greenhorns" got the bee craze as usual, and those who had bees and knew how to manage them properly,

made something out of them, and in a general way I am safe in saying that it has proved a very profitable year. Bees went into winter quarters in good shape with but few exceptions.

Some people are too greedy and anxious to grasp more of this world's goods than is their share, and some bee-keepers are not exceptions to this rule and have taken more honey from the bees than they should, the consequence of which is that many will starve to death this winter if not fed. Some are taking this precaution, and we hope to hear favorable reports in the spring. We have also had some foul brood in this district, and I would be remiss in my duty were I not to speak a word of praise for our foul brood Inspector, Mr. McEvoy. He has done us good service and many bee-keepers in this district are thankful to him for services rendered. Mr. Gemmell, too, has been with us in two conventions, Strathroy and Lucan, and with his presence and the benefit of his experience we have been pleased, our great regret being that more bee-keepers do not attend these conventions where they might learn more in half an hour than they can find out by plodding for a week.

No. 12. The early flow clover was generally very good, and bees strong enough to avail themselves of it. Saved a fair surplus from this source. Linden thistle and fall flowers were almost a complete failure. Many colonies have gone into winter quarters poorly provided with stores.

No. 13. The spring of 1891 was very dry, and the bees did not breed as fast as usual, so that when alsike clover began to yield, which it did early, many colonies were not up to their full strength. The clover honey crops was good while it lasted, some strong colonies giving 120 lb. of surplus when swarming was prevented, and the quality excellent, but few swarms issued. About July 14th basswood opened and the promise was very good, the hives being all full of bees. By this time, after working on it two days, cold rains set in and continued while the bloom lasted. Fall flowers only gave enough honey to keep up breeding late into September so that bees went into winter quarters with plenty of young bees. I don't think the average yield for the district would be more than 15 lb. per colony spring count, after leaving enough for winter stores with an increase of 25 per cent.

REPORT OF THE FOUL BROOD INSPECTOR.

Mr. Wm. McEvoy, foul brood Inspector then submitted the following report:

I commenced my official work the 18th of May, and with the exception of a few days I was out until the 3rd of October. I inspected one hundred and ninety-seven apiaries during the past season. These apiaries that I examined were in the counties of Welland, Lincoln, Wentworth, Oxford, Middlesex, Perth, Waterloo, Wellington, Halton, Peel, York, Ontario, Hastings and Simcoe, and in the cities of Hamilton, Stratford, Guelph and Toronto. After a careful consideration of the number of diseased apiaries which I found in so many localities, I believe there must have been over one thousand cases of foul brood. In most apiaries where I found foul brood I did not examine all the first time, but showed the disease to the owners telling them how to cure, and at the same time warning them that I had to burn what they failed to cure. I gave orders for the treatment of each apiary according to the condition I found them in. I then took the greatest of pains to explain everything very thoroughly to the owners, and then expected everyone to cure their apiaries of that terrible plague by my methods of curing foul brood. To have all diseased apiaries cured in the most profitable manner, and have as many if not more colonies at the close of the season than when I began, was always a consideration of mine. I looked closer after all the diseased apiaries in the villages, towns and all places where the bee yards were near each other, because I knew that if any diseased colonies in a neglected apiary were to get robbed by bees from neighbouring apiaries so near that they would all soon have the plague. I visited several localities the

second time, and am well pleased with the way the bee-keepers took hold of the disease and went in for a cure. In August I got an order to visit the bee yards at Tavistock, and there I found Mr. Schaffer's apiary one of the worst used up with foul brood of any I ever saw. I told Mr. Schaffer to make wax at once of every comb, in his colonies and out of them, and to put every two colonies into one before he began to cure, and then to feed each evening because there was little or no honey coming in at that time. Eight days from that Mr. Schaffer had his colonies cured of foul brood and in grand condition. After that, while on my rounds, I drove Mr. Gemmell to Mr. Schaffer's to see the good job we made out of such a horrid foul brood apiary at a time when little or no honey was coming in. In June I sent Mr. Bray to work in the County of Simcoe. I again sent him out in the same county in the last part of August. When he got through he sent me in a sworn statement of his work. He inspected eighty-one apiaries and found thirty-five apiaries with foul brood. Mr. Bray's time, car fare and livery hire amounted to $116.40; my time, livery and car fare amounted to $650.50. I burned one colony of bees at Guelph, one in Stratford, and ordered four burned in Woodstock which were burned by the owners.

The meeting then adjourned.

SECOND DAY—AFTERNOON SESSION.

The meeting resumed business at two o'clock, the President in the chair.

REPORT OF COMMITTEE ON AN OFFICIAL ORGAN.

Mr. GEMMELL read the following report:

To the President and Members of the Ontario Bee-Keepers' Association:

GENTLEMEN,—Your Committee to whom was referred the matter of publishing a journal under the auspices of the Association beg to report as follows: We assume that it is not advisable for the Association to purchase plant for printing etc., but that the work of printing should be done by contract. With a view to furnish the Association with data in regard to this part of matter we have made enquiries with respect to the probable cost of having the journal printed by contract, and the approximate income from subscriptions and advertisements, assuming that the journal is to be of the same size and quality of paper as that of the "Bee-Keepers' Review," that is to be published monthly, that the subscription price is to be one dollar per year, and that there will be one thousand subscribers to begin with.

We find that the cost of printing 1,000 copies will be $40 per month, or $480 per year, or $60 per month for 2,000 copies. We have enquired from two independent sources and find they agree as to the above figures. We have obtained information from a practical printer and publisher, which goes to show that the income from advertisements would pay the cost of printing especially after the first year. If this should be realized it will leave the amount received from subscriptions to be applied in defraying the expense of editing the journal and other incidental expenses.

The foregoing are the principal facts relating to the matter. We leave it for the consideration of the Association whether it is advisable to undertake the publication of such a journal or not.

All of which is respectfully submitted.

F. A. GEMMELL.
S. CORNEIL.
J. E. FRITH.

SHALL THE BEE-KEEPERS HAVE AN INDEPENDENT JOURNAL?

Mr. GEMMELL read the following paper on the question of an organ for the Association:

As this subject has already been discussed and also ably handled in a paper by Mr. J. E. Frith, read at St. Catherines last year, I need scarcely add more now, except to ask, shall the bee-keepers of Ontario have such a journal; and if not why not?

There was a time when insurmountable difficulties were in the way of making a practical and financial success of such without a supply business being attached thereto. Things have changed. Actual proof is not wanted to back up this assertion. Who doubts it here? If there are any such, I would refer them to the *Review*, published at Flint, Mich., U. S., as proof. Apiculture is not what it was in years gone by, nor in fact what it was even fifteen years ago. It is progressing. Notwithstanding this statement, there have been many induced to enter the ranks from having only the easy side of the pursuit presented them. Can any one dispute this? If so, now is the time and here is the place to do it. I claim had such a periodical as here mentioned been published ten years ago that foul brood, the great curse of our pursuit, would not now be a raging epidemic, but instead, all now keeping bees and many now out of the business would be to-day enjoying the pleasures of bee-keeping with immunity from the pest and profit to themselves. Am I right or am I wrong?

Mr. J. B. HALL would like to have a new bee-journal.

Mr. FRITH said that journals were managed by members of other societies, religious and otherwise, and that he thought it would be an advantage to have a channel through which our knowledge could be given to the bee-keepers of the province. He referred to the success of the *Canadian Horticulturist* which started fourteen years ago with sixteen pages and now has thirty-two. This journal is given to members of the Fruit-Growers Association, they only having to pay their membership fee of one dollar to the Association. In addition to the journal each member is given their choice of eight or nine kinds of fruit trees. He thought a journal would be an advantage to the bee keepers of the Province.

Mr. MCKNIGHT thought the Association could not manage such a journal successfully.

Mr. HARDING thought that we could not manage a journal successfully.

Mr. HUMPHRIES asked the question: Where would the funds come from to run a journal?

Mr. CORNEIL said the report of the committee would show where the funds might come from.

Mr. D. A. JONES said that the *Canadian Bee Journal* could be purchased by the O. B. K. A. if they desired.

A committee composed of Rev. W. F. Clarke, S. Corneil, F. A. Gemmell, R. McKnight, Jas. E. Frith and the president was appointed to confer with the managers of the *Canadian Bee Journal* to see what arrangements could be made.

REPORT OF COMMITTEE RE "BEE-JOURNAL."

The committee on arranging for the supply of the *Canadian Bee Journal* to members of the O. B. K. A. reported as follows:

To the President and Members of the Ontario Bee-Keepers' Association:

Your committee to whom was referred the matter of conferring with the present owners of the *Canadian Bee Journal*, beg leave to report that we find that the journal can be obtained for the members of 1892 at a reasonable amount for each, which offer we recommend to be accepted.

S. CORNEIL, Chairman.

AFFILIATION WITH NORTH-AMERICAN BEE-KEEPERS' ASSOCIATION.

The following report was read and adopted:

To the President and Members of the Ontario Bee-Keepers' Association:

Your committee to whom was referred the relation of Canadian bee-keepers to the North-American Bee-Keepers' Association, beg leave to report:

That the North-American Bee-Keepers' Association (as its name implies) was originally founded on an international basis; the United States and Canada being parties to, and partners in the organisation. For upwards of twenty years, and until a very recent period, this international character has been maintained, notwithstanding the manifestation of a disposition on the part of some of the United States bee-keepers to regard and speak of it as a national institution. This feeling took definite and formal shape at the annual meeting held at Keokuk, Iowa, last year, when a proposal to incorporate the Association under the State laws of Illinois was made and agreed to.

The delegates from this Association, present at that meeting, met the proposal with earnest remonstrance, emphatic protest and firm opposition, but in spite of their efforts, a committee was appointed to incorporate the body with headquarters at Chicago. One of your delegates was named as a member of that committee, but from what subsequently transpired he was led to believe that those with whom he was associated cared little for his opinion on the subject. Moreover, we have reasons for believing that the official report of the Keokuk meeting in the matter of the protests made by your representatives there, is largely characterised by a *suppressio veri*. That communications sent by them to two leading bee papers in the United States, discussing the subject, were not published, and that the great mass of bee-keepers within the jurisdiction of the Association were denied the information necessary to a full and proper consideration of the matter and of the means of arriving at a discreet and just decision, as to the effect of incorporation if carried out as proposed. A few weeks ago it was announced in the A. B. J. that incorporation had been effected. No particulars were then given. At the annual meeting held a month ago in Albany, N. Y., the report of the incorporation committee (which report had never been submitted to your representative on the committee, and who was present at the meeting) was presented and adopted. In brevity and *naivette* it is an official curiosity. No information is vouchsafed as to the terms and conditions of incorporation. The bald statement is, that "the Association is incorporated under the State laws of Illinois," that "the fees are paid and the certificate in the hands of the secretary." Not a word is said as to its probable effect in the other States of the Union, or here in Canada, but it embraces the important announcement that the incorporators are the "life members *resident in the United States!*" The life members resident in *Canada* are quietly ignored. Before the final adoption of this report one of your representatives at the Albany meeting asked if "incorporation as now effected did not localise the jurisdiction of the Association and make it an Illinois institution?" and was answered that "the Association was now local, *but its influence would be National.*" When he put the question in another form he was told, "it was necessary to incorporate under a State law, but the organization would be *National* in its character."

Your committee is not in a position to express an opinion on the future "influence" of the Association, or to closely scrutinise its character; nor is it within its province to inquire what particular relationship it bears to the bee-keepers of the United States resident *outside* the limits of Illinois, but it has come to the conclusion that Canada has no rights under the new state of things, and that it was not intended she should. This is amply clear from the fact that her life members are not amongst the incorporators, and that the widest character and influence claimed for it, by its promoters, are "National" and not International.

Your committee considers the changed nature of the Association is not a mere innovation, but a complete revolution in the ground-work and nature of the institution as it was heretofore constituted. Before, it was broad and international, now, it is local,

with but a declared national influence, and your committee look upon this change of organisation as a gross violation of an existing compact deliberately carried into effect in the face of the vigorous protests of your representatives.

Your committee are unanimously of opinion that the only course open to the bee-keepers of Canada, consistent with independence, self-respect, and national dignity, is to retire from a position which has become through no fault of theirs, anomalous if not humiliating, and therefore recommend that the Ontario Bee-Keepers' Association do not continue in affiliation with the so called North-American Bee-Keepers' Association.

Your committee have no hesitation in expressing the belief that the bee-keepers of Canada regret the circumstances that compel the severance of ties which have pleasantly existed for more than a score of years, and in their name, tender to the great body of American bee-keepers, which it believes are not responsible, the assurance of our continued fraternal good will, our high consideration and cordial regards, and of our readiness at all times to co-operate with them in any enterprise calculated to further the interests of the industry in which we are alike engaged.

All of which is respectfully submitted.

(Signed,) R. McKnight.
Wm. F. Clarke.
S. Corneil.
Allen Pringle.

ELECTION OF OFFICERS.

The following were elected to serve for the ensuing year:

President.—F. A. Gemmell, Stratford.
Vice-President.—Abner Picket, Nassagaweya.
Treasurer.—Martin Emigh, Holbrook.
Secretary.—W. Couse, Streetsville.

Directors:

District No. 1.—	W. J. Brown	Chard.
" " 2.—	J. K. Darling	Almonte.
" " 3.—	M. B. Holmes	Athens.
" " 4.—	Allen Pringle	Selby.
" " 5.—	S. Corneil	Lindsay.
" " 6.—	W. Couse	Streetsville.
" " 7.—	D. Chalmers	Poole.
" " 8.—	F. A. Rose	Balmoral.
" " 9.—	J. B. Hall	Woodstock.
" " 10.—	R. McKnight	Owen Sound.
" " 11.—	J. B. Aches	Poplar Hill.
" " 12.—	E. A. Jones	Kertch.
" " 13.—	D. A. Jones	Beeton.

Committees:

Executive: The President, R. McKnight, Secretary, and A. Pringle.

The following were appointed a committee to consult the Minister of Agriculture in regard to the management of grant or expenses of the foul brood inspectors, and for to apply for a similar grant for 1892: S. Corneil, R. McKnight, and J. B. Hall.

The following were appointed a committee to wait on the Minister of Agriculture in order to seek legislation to prevent the spraying of fruit trees in blossom with poison to the detriment of bees, which is at a time or season that is of no benefit to the fruit: Mr. A. Pringle, President F. A. Gemmell and Mr. E. H. Smith of Winona.

Printing committee to arrange the papers, etc., to be sent to Minister of Agriculture for publication: A. Pringle and the Secretary.

Delegates: A. Pringle, to Central Farmers' Institute; J. B. Aches, Poplar Hill, and J. B Hall, Woodstock, to the Western Fair Association; Mr. R. McKnight, Owen Sound, and the President, F. A. Gemmell, Stratford, to the Toronto Industrial Exhibition Association.

RENDERING OLD COMBS.

Mr. R. H. Meyers read the following paper: How to render old combs so as to get out all the wax and have it clean, and in a suitable condition for market, is a problem that has taxed the minds of the best bee-keepers all over the land, and many have been the methods resorted to from time to time. It is not my purpose to explain all the methods that have been used, because many of them are only practicable in the hands of specialists, supply dealers, or by those who have access to a good supply of steam. But I would call attention to two entirely different ways of rendering combs, new or old, (no matter how damp or moldy, or dirty with dead bees, larva, honey, etc.,) or bits of wax, cappings, or any other scraps that contain beeswax. I will try and make them so plain that every one can see that they are applicable to every bee-keeper, whether he owns two colonies or two hundred.

The method which is at once the easiest, cleanest, and in fact an automatic method and which produces the finest wax of any process known to date, is the sun wax extractor. It is very handy, and when placed out in the yard in some central location, all kinds of scraps or even whole combs, (frames and all) may be dropped into it, and when the sun shines it is always at work, the product of wax being nearly white, and the refuse reasonably clear of wax. I will not attempt to describe the sun wax extractor here, because being in the supply business, I would be accused of trying to advertise myself.

The other method is old, but if carried out as here directed, will get every particle of wax out of anything that goes through the process. Take any vessel you may have convenient in which water can be heated, the size to be such as will be best suited to your needs, make a bag of cheese cloth or 5c. factory cotton large enough to fill the vessel, leaving just room enough to turn it over with a stick when full; pound the combs up fine, (if you leave it until cold weather it will be easier done) fill the bag, put it into the vessel of water placed on a fire, heat it up to the boiling point, *but do not let it boil.* Now, with a stick or two, keep turning the bag over every few minutes for about one hour, then press the bag down to the bottom of the vessel, turning it over and over, pressing or working it all you can for ten or fifteen minutes. Place the sticks in such a position as will keep the bag down under the water, lift the whole off the fire, allow it to cool as slowly as possible, and you will find that the refuse does not contain wax enough to hold it together. When all is cold the wax will be in a cake at the top of the water, with a small portion of sediment at the bottom of the wax. The longer it has been in cooling, the more distinct will be the line of separation between the wax and the sediment.

One thing I would strongly impress upon the minds of those melting wax is this; if they desire to preserve the finest color possible, never allow it to come in contact with iron, zinc or brass while melted.

Mr. McKnight asked Mr. Meyers what effect would there be in wax that was brought to a temperature of boiling on wax that was a degree or so less.

Mr. Meyers said when wax bubbles, the particles that get exposed to the steam will not form properly, and apparently caused a great deal of sediment.

Mr. McEvoy said that in melting wax it should not be boiled.

Mr. Alpaugh would not render combs in hot water or steam, but would render them in an oven or a solar wax extractor, as there would be no effect from dampness.

Mr. Jones thought that wax could be over-heated in an oven.

Mr. Corneil said that Mr. Dadant said that he had heated wax up to 330° and that the wax did not seem to be injured, and he had himself put a thermometer in his wax extractor which went considerably over 212°, and that his wax appeared to be of good quality. He described his solar wax extractor. He had it double walled, and packed at the sides and bottom with sawdust, and had two glass covers through which the heat could be raised to a high degree.

Mr. Darling asked Mr. Corneil if the heat in the wax extractor would ignite the wood or sawdust.

Mr. Corneil thought that the heat went up to 228° in his extractor; but he thought that at about 500° the wood would ignite.

Mr. J. B. Hall said that formerly, when melting combs in water, he could not get wax without sediment, but now, by using the solar extractor, he got the wax without it

Mr. Meyers was asked if he had noticed any difference in the wax made from light or dark combs when boiled in a bag in water. He had noticed that when old combs are boiled in a bag, it is dark; but if put through the sulphuric acid process it would be fairly bright.

Mr. McKnight asked Mr. Meyers if the action of the sulphuric acid had any other effect on the wax besides brightening. Would it make the wax brittle? He did not notice any difference.

COMB OR EXTRACTED HONEY, WHICH?

Mr. J. B. Hall then read the following paper: At the request of our President my name appeais on the programme of this meeting, to give a short paper on "Comb or Extracted Honey. Which?" I suppose that I am to give my opinion of which should be produced? If so, that will largely depend upon the market the apiarist has to dispose of the product, the experience he has, his ability and judgment as an apiarist; also in regard to neatness and cleanliness.

To produce honey you must have the following:

A good pasture to supply the nectar, bees to gather the same, and some one of the many modern hives for the home of the bees, and convenient of manipulation to the apiarist.

To the apiarist who has the experience, is neat in all his work and cleanly withal, and closely attentive to the wants of his little friends and has a city market, by all means produce comb honey, as a No. 1 article, in clean sections, will always sell at paying prices. If you lack any of the above necessary qualifications, by no means try to produce comb honey, but give your attention to the production of the extracted article.

I would say that whoever would produce A1 comb honey should use a hive with a large top surface, and all spaces not more than five-sixteenths of an inch. He need not examine the supers every few days and pick out any sections that are finished, but so arrange things to take of not less than full supers, and then he will have work enough if he has an apiary of two hundred colonies.

If the market demands, and the apiarist wishes to produce extracted honey, by all means use a two or three storey hive, and keep the queen from the combs you use for extracting, and allow the honey to be capped before it is extracted; otherwise you cannot produce a choice article.

Mr. Hall was asked in what proportion could he get comb honey to extracted? He could get 80 lb. of comb to 100 lb. extracted.

Mr. Pringle said he did not get 80 lb. of comb to 100 lb. extracted.

The matter of honey being properly ripened when capped was discussed.

Mr. Pringle thought bees are not infallible in capping honey, as when honey is being

gathered rapidly it will sometimes be capped before it is ripe. He thought it would be difficult to tell honey that was extracted the day it was gathered and ripened artificially from honey that had been capped by the bees.

Mr. D. A. JONES thought that better honey can be got from combs that are thin than from thick ones.

ADDRESS OF WELCOME.

The Mayor of London favored the meeting with his presence, and gave a short address. He cordially welcomed the bee-keepers of Ontario to London, and hoped they were being well treated by the citizens.

The meeting then adjourned.

SPRAYING OF FRUIT TREES.

The Legislative Assembly of Ontario, at the late session, passed the following Act in reference to the spraying of fruit trees and the protection of bees :

AN ACT FOR THE FURTHER PROTECTION OF BEES.

(Assented to April 8, 1892.)

1. No person in spraying or sprinkling fruit trees during the period within which such trees are in full bloom shall use or cause to be used any mixture containing Paris green or any other poisonous substance *injurious to bees.*

2. Any person contravening the provisions of this Act, shall on summary conviction thereof before a justice of the peace, be subject to a penalty of not less than *$1.00* or more than *$5.00* with or without costs of prosecution, and in case of a fine or a fine and costs being awarded, and of the same not being upon conviction forthwith paid, the justice may commit the offender to the common gaol, there to be imprisoned for any term not exceeding thirty days unless the fine and costs are sooner paid.

3. This Act shall not come into force until the first day of January, 1893.

EVIDENCE TAKEN BEFORE THE LEGISLATIVE COMMITTEE.

Following is the evidence taken before the special committee of the House which reported upon the Bill :

Mr. ALLEN PRINGLE, Selby, ex-President of the Bee-keepers' Association of Ontario. —I really have had no personal experience in this matter, although I am convinced that the spraying of fruit trees with poison while in bloom is injurious, and that bees are frequently killed in that way. I remember at the last meeting of our Association one of the members of the Board made the statement that he had lost a great many bees in that way. It was a Mr. Humphries, I think. He claimed to have personal knowledge that the bees had died from the consequences of spraying trees while in bloom. His bees, he said, had visited the trees that had been so sprayed, and had been poisoned in that way. Evidence has appeared from time to time to the same effect in bee journals. I think I placed in Mr. Dryden's hands, some time ago, evidence on this question from an American bee journal. The writer, a Mr. Smith, gave a very full account of the facts of his case. His bees were dying off at a rapid rate, and he was quite unable for a considerable time to determine the cause, but persisted in his search for it until he traced the trouble to an orchard, the trees of which had been sprayed with poison—Paris green. The bees visited the orchard, and then returned to the hives, and died in large numbers. He made enquiries among his neighbors who kept bees within reach of the orchard, and found that they suffered in the same way with himself; and he satisfied himself that his bees and theirs were dying from Paris green used for spraying purposes in this orchard. Professor Cook, of the Agricultural College of Michigan, bears us out in this idea, and so, I think, does Professor Panton, of Guelph, who is here to-day. I think there is no doubt that bees are poisoned by the spraying of trees in bloom. I have no personal knowledge on the subject. I have kept bees for thirty years, but it is only lately that there has been spraying of trees. I have had no opportunity of being injured personally, but I am sure of the facts I have given you. That, I understand, is the main point that is required.

Mr. F. A. GEMMELL, Stratford, President of the Ontario Bee-keepers' Association.—I have very little to say on the subject. If there is any doubt as to whether or not bees can be poisoned, I think that point can easily be settled. Place in the apiary a little sweetened water with poison in it. Do this when the honey is coming in. The bees will very soon find it and die. If they will take up sweetened water containing poison, when in honey, they may be trusted to take up other poison in the same way My experience is that it is of no use spraying while the bloom is on ; when the bloom has fallen is the proper time. Spraying during the bloom is only throwing away time, labor and money.

WILLIAM MCEVOY, of Woodburn, Bee Inspector.—On my rounds through the province inspecting bee yards, I heard many complaints that bees were being killed wholesale on account of trees being sprayed while in bloom. It is a rather serious matter when it comes to wiping out bee yards alongside of orchards ; but it is more serious when the honey made from those yards is placed on the table, and a job possibly given to the undertaker.

A member of the Committee.—It would be well to be very careful in making such a statement as that.

Mr. MCEVOY.—Well, I have nothing else to add to what Mr. Pringle and Mr. Gemmel have said, except that if anybody should doubt that bees have been killed by the poison used in spraying, I may say that I have myself seen them dead and dying from the effects of it.

Hon. Mr. DRYDEN.—Why do you say that the honey would be injured? Have you any experience from which you can substantiate that statement?

Mr. MCEVOY.—Well, when the bees carry home enough poison to poison the larvæ, and a little to mix with the honey, I would not like to put the honey on my table.

Mr. AWREY.—Have you ever known an instance of honey being injured in this way?

Mr. MCEVOY.—No ; I don't know that I have.

Mr. HISCOTT.—Do you not think that the instinct of the bee would prevent it from taking anything containing poison?

Mr. MCEVOY.—I do not think so, any more than the potato-bug would be kept from poison by his instinct.

Mr. HISCOTT.—The cases are altogether different.

Mr. MCEVOY.—Even supposing the bees were not themselves injured by the poison they would most likely walk over it, and then again over the honey, and that would be a very serious thing.

Mr. AWREY.—This is a serious question, and such statements as these sent abroad through the country might very seriously injure our trade in honey.

Mr. GEMMELL —I might say that this point has been very carefully investigated by Professor Cook. The experiments were made in Colorado in 1888, and while it was shown that bees might be killed by the poison, a careful examination failed to disclose the least trace of poison in the honey. The experiment was made specially with the object of discovering whether or not the honey was injured.

Q.—Do you know any cases yourself of larvæ having been injured?

Mr. GEMMILL.—Yes, sir ; but I do not believe the honey is affected. The time at which trees are sprayed is when honey is being gathered for brood, not for surplus. Moreover, the bees that sucked in the poison would die before they had deposited their load of honey. The honey is certainly carried home, and I think it is possible that a small enough quantity of it might be carried home not to kill the bee, but in that case the honey, owing to the time at which it is gathered, would be used for brood.

Mr. MCEVOY.—I have seen colonies of bees dead of it ; I was in a locality searching for foul brood on one occasion and saw the bees dead, and the larvæ were dead.

Mr. GILMER.—Mr. Hiscott spoke of the instinct of the bee. The fact is they will take anything that is sweet, and so will take honey from the flowers even if they are poisoned. I don't know that I can add anything to what has been said. I have not lost anything from bees being poisoned. I think fruit growers have not sprayed their trees as a rule in my locality. Mr. Dancy is the only one who does it so far as I know, and I feel sure there is no danger of loss through his system of doing business. He does not spray during bloom. As for the surplus honey being poisoned, I think there is no danger of that. Spraying is not done at the time the surplus is gathered. I am thoroughly convinced that Paris green will kill bees, however, if spraying is done at a time when they are gathering honey.

Mr. A. W. PEART, Burlington.—I have been for some time in the habit of spraying apples, plums and cherries. My practice has been to spray immediately after the blossoms fall. I do this for two reasons—from seeing men who are posted on this subject, and from reading their writings, and from observation generally. My reasons for delaying the spraying until this time are because in the first place I have noticed that the flowers of a tree are much more tender and delicate than the leaves. The stigma of the flower in particular is tender and liable to injury. In spraying plum trees I have noticed sometimes that the poison has produced spots on the leaves. A similar injury to the blossom would either hinder or prevent fruition, and in my opinion this injury to the flower is less likely to occur if the spraying is done when the blossoms begin to fall. I think also that it would destroy insects better. I believe that in the fertilisation of flowers, the method of nature's working is that of cross fertilisation. It does not favor inbreeding in flowers any more than in individuals. The male and female flowers of the same flower do not fertilise with one another, but they each fertilise with the organs of other flowers. That is to say the female organ of one flower is fertilised by the pollen from another flower. For the accomplishment of this we have to rely upon the wind, and upon the insects, principally bees, who in brushing between the stamens and pistils of a flower get some of the pollen on their bodies and then transfer it to the female organs of other flowers which they subsequently visit. For these reasons I have delayed spraying until the blossoms fall. My experience has been favorable. I have sprayed plum trees, apple trees, and cherry trees, and I have left them unsprayed. The sprayed trees always give the more bountiful harvest. My experience in the use of Paris green has been entirely after the blossoms fall. I believe spraying has been a great help to me as a fruit grower.

Hon. Mr. DRYDEN.—Do you think that this Bill will be at all injurious to the fruit growers' interests?

Mr. PEART.—I am not opposed to the Bill. I think it is in accordance with the researches on these lines for the last ten years. I think it is in accordance with advanced and accurate thought during that period. I have taken pains to talk to fruit growers in the Burlington district, and find that without exception they delay spraying till after the blossoms fall, and are favorable to this Bill.

Mr. P. C. DEMPSEY, Trenton.—I have been spraying ever since I knew anything about it. We have sprayed for different objects for the last thirty years, but with Paris green only for the last five or six years. Before that we could scarcely keep a perfect specimen of an apple. But the spraying has been invariably done after the blossoms dropped. Since I have sprayed we would not find in fifty barrels of apples one barrel of bad ones, whereas before spraying was introduced it would have been difficult to get that number of really good ones out of the same number of barrels. I attribute the change altogether to spraying in the proper season. As to the injury done to bees, I have had a little experience. I keep 150 colonies of bees right in my orchards. I have never seen them suffer any injury on account of spraying.

Hon. Mr. DRYDEN.—I suppose you never sprayed during bloom.

Mr. DEMPSEY.—No, not in the case of apples, but the petals adhere very much longer in plums than in apples. Sometimes they do not drop off at all and the pistil of the flower will be found standing quite erect, and the curculio works upon it before the

petals drop. The nectar ceases to form and the embryo is formed. Sometimes the petals are found dried up. In such cases as these, with cherries und plums, we sometimes spray before the petals drop. We have to spray plums and cherries frequently, because the poison washes off, and we have to spray apples two or three times. I have never found any injury result from spraying as we have done it. I don't think we have a man within twenty miles who would spray in such a way as to injure his neighbor's bees.

Mr. SPRAGUE.—Do you think spraying trees in full bloom will destroy insects as well as when out of bloom?

Mr. DEMPSEY.—No, I do not think it will. My reason for spraying late is that at that time some of the petals drop right over the calyx, and we miss getting the poison into the calyx. If we do it at the proper time, and we have ten days to do it in, it is sure to be complete and effectual in destroying the insects and there is no second brood to attend to.

Hon. Mr. DRYDEN.—Then you believe that a Bill prohibiting spraying while in bloom would be a benefit?

Mr. DEMPSEY.—Yes.

Capt. FELAN, Oakville, said: I think the proper time to spray is when the blossoms fall.

Mr. AWREY.—Then you think the provisions of this Bill, which prohibits the spraying of trees while they are in bloom would work no injury to the fruit-growing interest?

Capt. FELAN.—No, I do not think there is any necessity for spraying at that time. I am not a bee-keeper, and don't want to have anything to do with them. I do not think the Bill will do any harm, though, but it may be well to be careful. I do not think there are twenty-five hives within five miles of me, and I am the only man, I believe, who sprays in my section. I intend to spray for the scab in apples this year. It is a very few years since I knew anything about it, but I intend to try it again this spring.

Mr. G. E. FISHER, Burlington.—I live in the same neighborhood with Mr. Peart, and we have talked this matter over together. I have very little information to give. I have had longer experience than Mr. Peart, but not more varied, and my experience corresponds entirely with his. There is one matter I would direct your attention to. It is a law of animal life. That is, an in-breeding, as Mr. Peart mentioned, will produce degeneration of the species, and this prevails equally in vegetable life. The pistils and stamens of a flower do not mature at the same time. It is necessary that the pollen that fertilises the pistils of the flower should come to it from another. We depend upon the winds in part for this; but we depend upon insects in part also. The bee is the most active of these. To induce the bee to accomplish this work Providence has placed nectar at the bottom of the flower. The bee goes for the nectar, and in getting it, it brushes the pollen off the flower which it then takes to the organs of another flower. We are very generally dependent upon insects for the fertilisation of our orchards. To destroy them to any extent would be very injurious to fruit growers.

Hon. Mr. DRYDEN.—You don't think this Bill will injure them, then?

Mr. FISHER.—No; I think it is just what they require. If a man does not know enough not to spray his trees while in full bloom there should be an Act to prevent him from doing so. As to bees being injured by picking up Paris green, I have had no personal experience. There is a gentleman living in Burlington who told me one of his neighbors used Paris green on his trees while they were in bloom, and while it was going on he noticed that many of the bees died.

THEO. WOODRUFF, Niagara Falls.—I am a fruit farmer and cannot quite agree with what some of these gentlemen have said about spraying trees. I think trees, especially the plum and cherry, should be sprayed when the blossom is going off, but not when it is in full. I agree with them as to that spraying should be done just when the blossom is going off. I experimented last season in the matter. I sprayed in some cases after the blossom had gone. In those cases I never got a perfect specimen of fruit. That shows the difference. It is too late then to do it. As soon as the fruit is formed it gets too

hard for the curculio to work in. So far as the bees are concerned, I don't know much about them, except that they rob my orchard every year. I know it by experience.

Hon Mr. DRYDEN.—How ?

Mr. WOODRUFF.—They sting them and eat them. I have known them to eat a peach nearly up. Some of my neighbors close by have some bees, and they feed on my peaches. I am perfectly certain that they carry the "Yellows" from one section to another. I know they brought the "Yellows" from another section to mine. I don't know where in the world you are going to draw the line if this Bill is passed. Now, I get a lot of fruit off my plum trees, twelve, fourteen or even sixteen baskets on each tree. If this law is placed on the Statute book, I should hate not to be allowed to go through and spray them.

Hon. Mr. DRYDEN.—But this Bill is only to prevent spraying the trees while they are in bloom.

Mr. WOODRUFF.—Well, there would be the difficulty. The bloom might be on some trees and not on others. I don't think it is right. Fruit growers should oppose that Act. I know there are a number of others in my section who would give more evidence on this question. I am an amateur fruit grower, but I read a good deal. So far as spraying after the blossom is off, I think that is the wisest course.

Mr. AWREY.—Do you object to spraying the trees while they are in full blossom ?

Mr. WOODRUFF.—It were better later.

Mr. AWREY.—Then why do you oppose the Bill ?

Mr. WOODRUFF.—Because I do not believe it is possible to draw the line.

Mr. E. MORDEN, Niagara Falls.—I am a fruit grower and not a bee man, though I have a few bees just now to assist in fertilisation, and in sweetening the course of life generally. I have heard a good deal of discussion on this question at fruit growers' meetings and at Farmers' Institutes, but I have never yet met a speaker who advocated spraying trees during full bloom. In my own case I am always very particular at the meetings which I address in both countries to advise against this course. In the case of codling moths and curculio it would in fact be useless, as these insects are not so foolish as to deposit eggs on the blossom because the greater mass of the blossoms never produce fruit. It would be a great mistake from their point of view to deposit eggs on twenty blossoms, only one or two of which bore fruit. They deposit it on the calyx of the little embryo fruit. In the case of the plum, I have observed it for many years, and notice that they rarely operate until the fruit has attained some little size. With me curculio are not very energetic at first, but they make up for it later. They do not appear until about a week after the blossoms fall ; then they are very numerous for about ten days, after which they become comparatively rare. It is during those ten days that we ought to spray. To spray earlier is foolishness and unnecessary. This applies in any case to the codling moth and the plum curculio, but in the case of other insects it might be better to spray during the blooming season. The canker worm and common caterpillar we can spray after or before blooming and do equally well.

Mr. HISCOTT.—You think sometimes it might be necessary to spray during bloom.

Mr. MORDEN.—In the case of gooseberry and currant trees it might be.

Hon. Mr. DRYDEN.—Do they furnish any honey ?

Mr. MORDEN.—Very little.

Hon. Mr. DRYDEN.—But that would not be affected by this Bill.

Mr. MORDEN.—No ; Hellebore would not injure the trees. I have always made it a point to recommend spraying after the bloom. I had occasion to attend a meeting in the town of Niagara where the matter was discussed and nobody there advocated spraying during the blossoming season. In some earlier literature on the subject spraying at an earlier season was advocated. I have here an article in a fruit journal on "Our Insect Foes," written by Mr. Long, a friend and neighbor of mine. In this article he

gives the time for spraying, as, first, just before the blossom buds open, and second, about two weeks after the petals fall. In another part of the article speaking particularly of the codling worm it directs the spraying to be done immediately after the blossoms form. Here is another pamphlet on the subject written by P. C. Lewis, of Catskill, New York State, which is to the same effect. It recommends spraying just about the time the blossom is falling, or just as it is beginning to form. This should be repeated two weeks after the trees are out of blossom. All recent literature and all the speakers I have heard concur in this. In dealing especially with the plum curculio it is best to spray as soon as the blossoms fall, and again in about three weeks.

Mr. HISCOTT.—Were you ever bothered with the canker worm?

Mr. MORDEN.—Yes; we have had it in our immediate neighborhood. I have never found it necessary to spray for them during bloom. I have never had occasion myself. I think they would take it before the blooming season, and then again afterwards; although it might be sometimes convenient to do it just during bloom; but this would be very rare.

Mr. HISCOTT.—Have you never seen whole orchards destroyed by them?

Mr. MORDEN.—Oh, yes; now and then.

Mr. HISCOTT.—This is one particular class of insects I have been spoken to about in connection with this Bill, and I ask you as a fruit grower if there would be no difficulty in connection with it?

Mr. MORDEN.—Yes, there might be a little difficulty, but it is generally a local trouble, and moreover if it was not stopped from working before the bloom was on, it works so vigorously that the chances are the blossom would be destroyed.

Mr. KEW, of Beamsville.—The ground has been very much taken up by previous speakers. I have not had so much experience as some of them as a fruit grower. I have a large orchard. I have never seen so much occasion for spraying as some others, but have sprayed to some extent. I think the whole question resolves itself into one thing, and that is the most favorable time for spraying. I think sufficient evidence has been given to show that the bees would be injured by the use of the poisonous substances at an improper time. I have a great deal of faith in bees, and am a great friend of them. I do not keep them and I like them at a distance; but I think if we had no bees, or if their number was very much diminished, it would be the worse for us as fruit growers. The more bees, the better our crop of fruit. I think there is one kind of fruit that it would be hard to decide exactly when it should be sprayed. That is peaches. I prefer spraying peaches when the bloom is on, for the reason that in some varieties the petals close immediately afterwards, and if the spraying is left until after that there would be very little use in doing it at all. Thetefore I think the peach should be sprayed when the blossom is on. I am inclined to some extent to agree with Mr. Woodruff and regard the Bill as an interference with vested rights. I think I should have a right to feel aggrieved if I have a very large orchard, and am debarred from using my own judgment and experience as to the best mode of cultivating it. Supposing my orchard is composed of various kinds of apples, some of which blossom very late, I would have to wait until every individual tree was ready before I could spray. That would be very inconvenient and expensive, and might after all be of no benefit to the bee-keeper at all. I think fruit growers should be allowed to use their own experience.

Mr. AWREY.—But you would not yourself spray during bloom?

Mr. KEW.—Well, I have sprayed when in bloom, and found it did as much good as later, but it might have done the bees more injury.

Mr. AWREY.—But when you did this, you sprayed two or three times.

Mr. KEW.—Yes.

Mr. AWREY.—Then you can not be sure which spraying was of the most use, that before, during, or after bloom.

Mr. KEW.—Perhaps not.

Hon. Mr. DRYDEN.—Do you think this Bill would be injurious to you as a fruit grower?

Mr. KEW.—I would not like to say that positively, though many might think so.

A MEMBER OF THE COMMITTEE.—Is not the question that your rights would be infringed more in your mind than the doubt of injury being done to your fruit?

Mr. KEW.—Well, it might cause a good deal of litigation.

Mr. HISCOTT.—Mr. Fisher is Clerk of the township of Niagara. He has a farm which he bought for $6,000 and has made worth $30,000. He has made his money by the fruit growing interest there. I have a letter from him in which he strongly condemns the Bill, and asks me to do what I can to prevent it being passed.

The letter was produced and read by the chairman.

Professor FLETCHER, Entomologist and Botanist, Experimental Farm, Ottawa.—I think nearly all the points have been touched on. The only important part of the flowers as far as we are concerned is the pistil or the stigma, the part which receives the pollen which fertilises. This pistil is very sensitive, and a very weak solution of Paris green would kill it if it touched it, and prevent the formation of fruit. There is no doubt that bees can be poisoned, but they are not the same as potato bugs, of which a gentleman spoke of just now; they are much more highly organised. Potato bugs can eat Paris green. But bees and similar insects are more sensitive. If any one wants to see a very easily tried experiment, mix a little Paris green with sugar, and you can not get house flies to touch it. Bees are much more easily killed than other insects. Some beetles will last a long time in a very strong poison; but bees die quickly on account of their higher organisation. There is no doubt that bees can be destroyed by the use of poisoned liquids. There is no accurately recorded experiment as to the particular point of whether or not bees have been killed by spraying. A good many opinions have been expressed on the subject, but no experiment has been made that can be regarded as an exact scientific record. We must simply await the details of such an experiment before we can judge positively on that point. I have made arrangements with the State Entomologist of Ohio, following up a discussion on the subject, to try and secure exact experiments as to whether bees are actually poisoned by spraying when in bloom. I do not believe the honey is at all affected; it can not be. The poison taken by the bee, when any is taken, is in the nectar that comes from the flowers, and before the bee can carry this from the laboratory that makes the honey to deposit it, the bee is dead, so that the honey in question is never deposited. I think it is very important that that point should be made clear, in view of what Mr. Pringle stated just now. The bees will almost always die before depositing their load, and even if they do not this honey is not used for surplus, but for feeding their young. As to spraying, if you wait until the flowers are all gone, you will cover the canker worm and all the insects I know, except the budworm, and in the case of the budworm I think it is necessary to spray before the flower is open. As to the codling moth and the curculio, there is no possible use in spraying for them while the fruit is in flower. As to the fruit getting too hard for insects to hurt and making it useless to spray, I may say that in California they injure the fruit right up to the time when it is full-grown. Some of the roughest peaches are injured by the curculio. A rough covering is no protection at all. I don't think there is any use in spraying the cherry until it is at least as big as an ordinary sized pea. The curculio lives a long time and during all that time it does injury. Fruit is only injured after it is firm. As to the codling worm, one point about it is that the eggs laid in the calyx do not hatch at once. Apple trees remain in flower about a week. The eggs are not laid until the flowers are in full bloom. Wait till they all drop, and you will be in time to spray. When the flowers are numerous the fruit crop is large. Bees do not visit fruit in dull weather, and we get little fruit in consequence. Two years ago we had very dull weather during the fruiting season, and we got very little fruit because the bees were hardly moving.

Hon. Mr. DRYDEN.—How about bees destroying fruit.

Prof. FLETCHER.—Well, I cannot help thinking that Mr. Woodruff was mistaken there. I can only say this, that all my experience and careful investigation, and all the

investigations of the Entomological Society of Ontario, go to show quite the contrary; at least that in no case is primary injury done by bees. I never could find a single instance of it. There are instances in the case of the wasp. But the bees are apt to continue an injury after it has once started. If they find a hole in the fruit they may make it larger. But we have never been able to find a case of primary injury done by the bees themselves. The point came up for discussion at the recent meeting of the Fruit Growers' Association, but I was not present at it. We know, however, that the bees are called the fruit growers' friends, and that they are necessary to the fruit, to fertilise it. As to the question of their carrying "yellows," as Mr. Woodruff suggested, that is a point requiring very serious consideration. We do not yet know even what the "yellows" are. The United States government has had them under investigation for the last three or four years, but I believe the investigator does not yet know what they are. We have to have more proof on the point before we can accept this claim, as far as I am concerned, and as to bees injuring the fruit, the skin has to be broken before the bees attack it. It was a long time before we could catch the wasps at it, but we know now they do it. I would not like to say the bees could not injure fruit. They have mouths and very hard mandibles. With regard to spraying it may not be amiss to draw attention to the false statements of the English press, that our apples are poisoned from their absorbing arsenic. The statement is absurd and impossible. The physiology of the plant renders such a thing impossible. The same thing used to be said of potatoes, though before the fruit of the potato could be injured the poison had to go through the leaves. This was long since proved to be absurd. It is the same with the pistil of an apple. It cannot absorb arsenic or any other poison. It is very important for us to be always on our guard in this matter. The same charges were made some time ago, and refuted. They ceased for a time, but have been now commenced again. The object of the cry is simply to get a little cheap advertisement out of the cry of "Poison in American apples," because we are spraying with Paris green. If we could only get our farmers to spray more we would have better fruit crops. Spraying has really been only introduced here for two or three years, but more of it is done this year than before. I think there is nothing in this Bill but advantage to the fruit-grower. If we spray the trees at any other time than in full bloom, we still kill the insects and do no harm to the bees.

Prof. PANTON.—The question has been already pretty thoroughly discussed. The summary given by Prof. Fletcher is just what I would have said myself. When the question of this Bill came up in correspondence with a gentleman, I really did not see the need of it. I could not imagine anyone was doing what the Bill prohibits. In all cases of spraying that had come under my observation it was invariably the rule not to spray during bloom. But if there are people who will persist in doing such a thing, I should certainly think it necessary to have a Bill to prevent it and to protect others. I have found one case of a person who is said to have sprayed right and left for two years, but that is the only case of the kind I have noticed, except that of Mr. Woodruff here to-day; and even Mr. Woodruff does not claim that he sprays during full bloom. I can not see where the Bill would injure fruit growers at all. It is in accordance with the teaching of all science. Here is a point where there may be a little difficulty. The Bill says "Paris green or any other substance containing poison." There are poisons and poisonous substances that may not be injurious to bees. We do not know what spraying may come to yet. It has already become a splendid protection to fruit growers. It used to be a different remedy for every tree. Now it has become so effective and uniform that it can be effected with ease and immediate practical results. So that I can not see any objection to the general principle of the Bill. In reference to the question of the bees being poisoned, I think it is well worthy of investigation. None of us to day can actually say that bees are poisoned from arsenic used in spraying, I do not think there is a man to-day who can say so. But, of course, things point in that direction; and we must always pay the greatest respect to the practical men who supply the facts. The Bill, in my opinion, is most practical, and must be most beneficial.

Mr. PRINGLE.—There is one point I would like to add to what I said just now. The Bill prohibits spraying while the trees are in full bloom. That, I am afraid, will

leave a loophole for getting over it altogether. I submit that after what the professors have stated there is no need to spray while the tree is in bloom at all, and it would be better to prohibit it while the tree is in bloom.

SPRAYING FRUIT-TREES WHILE IN BLOOM.

(Prof. Cook in *Gleanings in Bee Culture*, May 1st, 1892.)

I am very happy to give you in advance the experiments which we have made, that I am sure will convince all. These are now in type, and will soon appear in the Report of the Michigan State Board of Agriculture, so there is no need that any other station should demonstrate these facts, except that, the more that do such work, the sooner will the results be known to the people, and the sooner will practical results be obtained.

Let me premise by saying that, in several cases in Michigan and other states, especially Illinois—states where the value and safety of spraying were first demonstrated, and hence where spraying has been most general—there have been serious losses of bees at the time of apple-bloom. Not only did the mature bees die off rapidly, but there was extensive mortality of the brood. These colonies were strong, and had survived the period of the so-called "spring dwindling." Every well-informed experienced bee-keeper like Mr. Elwood knows that such mortality at such time was previously unknown. In every case, large orchards in the immediate vicinity had been sprayed with the arsenites while the trees were in bloom. Previous to this I had tried several experiments in feeding bees sweetened water, with the common London purple and Paris green of the drug stores added in the same proportions that we use it for spraying. In every case the bees were poisoned. Yet they did not die at once; indeed, they lived many times longer than would be necessary to carry the poisonous liquid to the hives and store it there. This explains why the brood is also poisoned. As these people wrote to me of their losses—quite a number have done so, and from at least three States—I had no doubt that the spraying at the wrong season was the cause. 1. The poison would do it, as I had repeatedly proved; 2. The poison was thrown on to trees while in bloom, and the flowers had been freely visited by the bees; 3. Such loss of bees in this manner and at this season was unprecedented in our bee-keeping history. I at once recognised the danger, informed the bee-keepers directly interested, proclaimed through the bee papers the dangers that threatened bee-keepers, warned fruit growers of the danger, and urged them for their own interests, as well as for the good of their bee-keeping neighbors, *never to spray while the trees are in bloom.* I have also tried to secure legislation that would prevent such untimely spraying.

No bee-keeper need be told that negative testimony counts for little in this matter. That some one has sprayed his trees while in bloom, and yet no bees were known to be lost, would deceive an entomologist who was not an apiarist; but a bee-keeper would know that the spring is often so cold that the flowers secrete almost no nectar, and the bees are often unable to fly at all. While, then, in many cases, spraying the trees while in bloom would cause no loss, yet in another case when the weather was mild so that nectar was abundant, and the bees out in force, the loss would be most serious. I presume this explains the reports from the entomologists at the meeting in Washington.

Our experiments the last summer, already in print (Report of Michigan State Board of Agriculture, 1891, p. 127), are as follows:

How Strong shall we Use London Purple?

Some years ago we tried a series of experiments to determine the minimum strength of London purple or Paris green that would surely prove effective in the destruction of insects. The conclusion was, that 1 lb. to 200 gallons of water was as weak as we could safely use it. This year we repeated the experiments. We used two species of oak caterpillar—*Anisota stigma* and *Anisota senatoria*; a hairy caterpillar on the oak—*Halesidota*

tesselata ; the cabbage caterpillar—*Pieris rapœ ;* the potato beetle—*Doryphara tenlineata,* both larva and imago, and the honey bee. All except the honey bee were treated outdoors, on the plants or trees, and all, including bees, were fed in cages in the laboratory. We used the London purple, 1 lb. to 200, to 300, to 400, and to 500 gallons of water. In every case 1 lb. to 200 gallons of water was quickly fatal. The weaker mixtures were not satisfactory, especially on the older larvæ and the imago. The weakest mixture, 1 lb. to 500 gallons of water, failed to do thorough work in every case. The other mixtures, 1 lb. to 300 gallons of water, and 1 lb. to 400 gallons of water, were tardy in their action, and did not do the execution that 1 lb. to 200 gallons did.

One lb. to 200 gallons of water killed the honey bees and the imago potato-beetles almost invariably within twenty-four hours. We find that larvæ succumb to the poison more quickly than do imago, and that young or small larvæ die more quickly than do older ones. Thus our experiments agree with those previously made in fixing upon 1 lb. to 200 gallons of water as the most desirable proportion to use in all cases. There is so little difference between London purple and Paris green that the same strength should be used with both poisons.

Poisoning Bees.

We see from the above that the standard mixture—1 lb. of either London purple or Paris green to 200 gallons of water—is fatal to the honey bee. This makes it imperative that fruit trees be not sprayed while in blossom. It may be done just before or at any time afterward, *but never during the time of bloom.*

The above, written last October for our Report for 1891, settles the matter positively. When we add, that during bloom is not the time to spray; that for bud-moths and fungi it should be done earlier, and for the codling moth later—not till the blossoms have fallen from all the apple trees—we thus see there is no possible excuse for spraying while the trees are in bloom ; while there are very important reasons, as we have just seen why no one should spray while the blossoms are still on the tree.

It has seemed to me, and I am now stronger in the faith than ever, that every state should pass a law making it a serious misdemeanor to spray our fruit trees while in blossom. I do not think such a law would need to be used much, if ever ; but as an educator it would do signal service. It would act as our foul brood and yellows laws have. When men find that there is a law against any proposed course of action, they will almost always hesitate before they act. In a case like this, where there is no cause for wrong action, but every reason for doing that which will work no one ill, but the most good to all, then surely if a legislative act will have influence it should be urged by all, whether directly interested or not. Is it not wise for every bee keeper to agitate this matter, that the public may be educated at least, and that such legislation may be secured as will aid to prevent any spraying during the time that the fruit trees are in blossom ?

MISCELLANEOUS EXTRACTS.

Circular No. 1, Second Series, U. S. Department of Agriculture, Division of Entomology, May, 1891 : With the apple, in spraying for the codling moth, at least two applications should be made—the first on the falling of the blossoms, the apples being about the size of peas, and the second a week or ten days later, but the poison should never be applied after the fruit turns down on the stem, on account of the danger of the poison collecting and remaining permanently in the stem cavity.

For the plum curculio on the plum, cherry, peach, etc., two or three applications should be made during the latter part of May and the first half of June ; in the case of most leaf-eaters spray on the first indication of their presence.

Fruit trees should not be sprayed with arsenical poison before the blossoms fall, on account of the danger of poisoning honey bees.

Bulletin No. 19, Pennsylvania State College Agricultural Experiment Station April, 1892: To be effectual the spraying must be done at the proper time. To kill the apple worm or codling moth the trees should be sprayed just after the blossoms have dropped, for it is known that then the larvæ are hatching from the eggs, and beginning to burrow or eat their way into the forming fruit. The smallest amount of poison at this time will kill the worm. After ten days the trees should be sprayed again. If a rain should intervene it should be followed by another spraying immediately to keep the poison on the fruit. All this should be done, too, before the young apple turns downward on the stem, as the egg is laid at the flower end, where also the poison should lodge to do its intended work.

Bulletin 86, New Jersey Agricultural College Experiment Station, April 4, 1892: The larva of the codling moth attacks apples, pears and quinces, and annually injures and destroys a large percentage of these fruits. The moths make their appearance at about the time the trees are in bloom, and as soon as the young fruit has set they begin to deposit their eggs. They fly usually at night and are thus rarely seen. The eggs are laid on the young fruit at the blossom end, in the cup left by the falling flower, and in a week or ten days the larva hatches. Egg-laying continues about two weeks, so that the danger period for codling moth is from three to four weeks after the blossoms drop. It is impossible to set a fixed date when the first spraying should be made, as this will vary with the season, the locality, and even the variety grown. The best index is in the point of development of the fruit. As soon as all the blossoms are off and the fruit has fairly set and still points blossom end up, make your first spraying. Do not delay too long for most of the eggs are laid early. The poison lodges in the little cup in which the egg is laid, and the larva, when it hatches, finds a poisoned dish spread for it. It is the habit of the young larva to feed a day or two on the outside of the fruit before boring into it, and this is the only chance for the poison to take effect. At this time the fruit grows rapidly, and there is usually more or less rain, so that the covering of poison becomes washed off. It is therefore necessary to make a second spraying a week or ten days after the first, to renew the coat of poison. If the weather has been clear, or with only light rains, it is safe to delay ten days; if there have been heavy, washing rains a week is as long as it is advisable to wait. If the weather after the second spraying remains absolutely fair for ten days no further applications are absolutely necessary, but it is always better to be on the safe side and spray a third time. If there has been much wet weather there should always be a third spraying a week after the second. If there be no third spraying a few larvæ will generally escape and provide for a second or midsummer brood which will injure much of the fruit that escapes the early worms.

The habits of the plum curculio are essentially different from those of the preceding. While the codling moth does not itself feed upon the fruit, the curculio eats into leaves, buds, blossoms and fruit, making unsightly round holes in the latter. In laying its eggs, it places them into, not on, the fruit, first cutting loose a little flap of tissue to receive them, so that the growth does not crush them. The larva hatches in this flap and penetrates into the pulp at once without ever coming to the surface. We therefore cannot poison this insect in the larva stage as we do the codling moth, but must direct our attention to the adult. This makes its appearance as soon as the foliage begins to show, and feeds on leaves and buds before the fruit is formed. After the fruit has set it feeds and oviposits on this, continuing until well along in June before getting rid of its entire stock of eggs. To control this species we must poison the adult beetle. As it begins feeding as soon as there is anything to feed upon, the first spraying should be made *before* the trees are in bloom, and at least three sprayings should be made afterwards as directed for the codling moth. As the poison does not adhere so closely to the surface of the fruit as it does in the blossom cup, the result is not so certain, but unless the weather is very rainy a large proportion of the beetles will be killed. As each female lays a large number of eggs the destruction of even a small proportion would be beneficial.

Where both codling moth and curculio are troublesome, the spraying should be done as for the curculio alone, for what will serve to destroy it will also answer for the moth. Spraying *before* the blossoms are out is important as against the curculio only. *Never spray trees while in bloom.*

Bulletin 83, Michigan Agricultural Experiment Station, April, 1892: In some seasons the curculio appear before the flowers open, and as it is not advisable to spray while the trees are in bloom, on account of the injury it would do to the bees, an application made just before that time would be likely to destroy all the curculio that appeared during the period of bloom. In case rains wash off the poison it should be reapplied.

If arsenites are used the trees should not be sprayed while in bloom, on account of the danger of poisoning the bees. After careful experiments for three years we are convinced that we must look to the copper compounds for our remedies.

When Paris green was first used on potatoes, for the Colorado beetle, many persons hesitated to make use of it, fearing that they might be poisoned in applying it, or that the tubers would absorb the poison, to the injury of the persons eating them. No harm ever came from the use of arsenites, for this purpose, except through gross carelessness, and it is now the universal remedy. When arsenites were first proposed as a remedy for the codling moth, and other insects attacking fruits, everyone had become so accustomed to the use of arsenites that it met with very little opposition on the ground of danger to health, and in many secctions of the country the practice of spraying is quite general. Recently, however, some of the English journals have commenced a crusade against American apples, on account of the use of Paris green and other arsenites upon them. They have been freely used in this country for more than ten years and no case of poison can be traced to them; and at the lowest possible estimate a person would have to eat twenty bushels of apples at a single sitting to obtain enough arsenic for a fatal dose.

"*Insect Life*," April, 1892: At last fruit growers and bee-keepers are getting into right relations with each other. The numerous discussions which have taken place regarding the value of bees as fertilisers of fruit blossoms and of those blossoms of plants grown for their seeds, and regarding the alleged damage to fruit by bees, have led to close observation and careful experimentation, the results of which show that the interests of these two classes of producers conflict but in trifling respects—that, in fact, bee-keepers and fruit growers are of great help to each other and even indispensable if each is to obtain the best results in his work.

Bee-keepers have never complained but that the growing of fruit in the vicinity of their apiaries was a great benefit to their interests; hence their position has been merely a defensive one, the battle waxing warm only when poisonous substances were set out to kill off the bees, or when fruit growers sprayed their orchards with poisonous insecticides during the time the trees were in blossom, or again when efforts were made to secure by legislation the removal of bees from a certain locality as nuisances. Fruit growers at first relented when close observation and experiment showed that wasps bit open tender fruits, birds pecked them, they cracked under the action of sun and rains, and hail sometimes cut them, the bees only coming in to save the wasting juices of the injured fruit. The wide publicity given to the results of the experiments made under the direction of the United States Entomologist and published in the report of the Commissioner of Agriculture for 1885, have no doubt contributed much to secure this change among fruit growers. But now it would appear that the bees have not only been vindicated, but that in the future fruit growers are likely to be generally regarded as more indebted to bee-keepers than the latter are to the fruit growers, for the amount of honey the bees secure from fruit blossoms comes far short of equalling in value that part of the fruit crop which many accurate observations and experiments indicate is due to the complete cross-fertilisation of the blossoms by bees. The observations and researches of Hildebrand, Müller, Delpino, Darwin and others, as well as the excellent explanation of the subject in Cheshire's recent work, have gone far to prove how greatly blossoms depend upon the agency of bees for their fertilisation and hence for the production of seeds and fruits."

ANNUAL REPORTS

OF THE

POULTRY AND PET STOCK ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1891.

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ANNUAL REPORT

OF THE

POULTRY ASSOCIATION OF ONTARIO.

To the Honorable the Minister of Agriculture :

SIR,—The eighteenth annual exhibition of the Poultry Association of Ontario was held in the town of Bowmanville, January 4th to 8th, 1892. All classes of poultry and pigeons were well represented, and all were in first-class condition and showed to advantage.

All classes were divided into four sections, viz., cock, hen, cockerel and pullet, and three prizes were given for each: first, $2; second, $1, and third, 50 cents.

The following gentlemen were chosen to act as judges on poultry: Messrs. Sharp Butterfield of Windsor, Thos. H. Smelt of Woodstock, and L. G. Jarvis of Port Stanley; and on pigeons, rabbits and cage birds, Mr. Geo. E. Peer of Rochester, N.Y. They gave general satisfaction, performing their respective duties well and in less time than at any previous exhibition, as they had about one-third more birds to score than at any previous show, and the score cards and prize tickets were on all coops and cages by Thursday noon.

The total number of entries was 1,224, divided up in the following classes:

Class.	No. of Entries.		Remarks on 1892 Exhibit.
	1891.	1892.	
Light Brahmas	.....	26	Quality extra; only one bird disqualified.
Dark Brahmas	15	24	Quality extra good.
Buff Cochins	22	22	"
Partridge Cochins	9	17	Better quality than last year.
Black Cochins	.....	8	Quality good.
White Cochins	.....	6	"
Langshans	33	38	Quality better than last year.
Silver Grey Dorkings	14	20	Quality almost the same as last year.
Colored Dorkings	11	22	" "
White Dorkings	9	11	" "
Game, Black Breasted Red	15	25	Quality much improved.
Game, Brown Breasted Red	4	12	"
Game, Duckwings	4	12	"
Game, Pyle	12	17	"
Any other variety Game	1	10	Quality good.
Indian Game	12	12	Quality about the same as last year.
Malays	.....	6	
Barred Plymouth Rocks	39	53	Much better quality than last year.
White Rocks	20	24	Quality much improved.
Silver Laced Wyandottes	7	27	"
Golden Laced Wyandottes	7	20	"
Black Wyandottes	.....	5	Quality only medium.

Total number of entries.—*Continued.*

Class.	No. of Entries.		Remarks on 1892 Exhibit.
	1891.	1892.	
White Wyandottes	12	22	Quality about the same as last year.
Black Javas	.....	14	Quality extra good.
Black Spanish	15	15	Quality greatly improved.
Black Minorcas	18	30	A great improvement in quality.
White Minorcas	6	15	Much improved in quality.
White Leghorns	6	36	A great improvement in quality.
Brown Leghorns	20	36	Quality much improved.
Black Leghorns	2	15	Quality good.
Brown Leghorns, Rose comb	8	9	Quality much improved.
White Leghorns, Rose comb	8	16	"
Andalusians	16	18	"
Houdans	21	27	"
Creve-Cœurs	4	6	Quality very good.
La Fleche	1	2	"
White Crested Black Polands	8	8	Quality about the same as last year.
Golden Bearded Polands	7	9	" "
Silver Polands	8	11	Quality not so good as last year.
White Polands	8	8	Quality about the same as last year.
White Polands, Bearded	7	9	Quality not as good as last year.
Golden or Silver Polands, unbearded	8	7	Quality about the same as last year.
Golden Spangled Hamburgs	6	8	Quality very good, but no improvement over last year.
Silver Spangled Hamburgs	13	18	Quality better than last year.
Golden Pencilled Hamburgs	10	6	Hardly as good quality as last year.
Silver Pencilled Hamburgs	15	8	A slight improvemet in quality.
Black Hamburgs	10	20	An improvement in quality.
Red Caps	.....	14	An added class this year. The quality was very good, and this variety ought to be encouraged, as they are so much larger than Hamburgs.
Any other variety	12	10	Quality as good as last year.
Black Red Game Bantams	21	22	Quality much improved.
Brown Red Game Bantams	3	3	"
Duckwing Game Bantams	8	13	"
Pyle Game Bantams	16	16	Quality very good ; about the same as last year.
Golden Sebright Bantams	8	15	A great improvement in quality.
Silver Sebright Bantams	10	10	"
White or Black Rose Comb Bantams	19	14	Quality as good as last year.
Pekin Bantams	13	15	Much improved in quality.
Japanese Bantams	8	10	Improved in quality.
Polish Bantams	3	4	Quality extra good.
Bronze Turkeys	17	19	Quality extra good, and very large birds, some of them weighing over forty pounds.
White Turkeys	2	2	Quantity and quality about the same as last year.
Tolouse Geese	5	7	Quality very good, but not up to weight.
Bremen Geese	7	10	" "
Rouen Ducks	14	10	Quality better than last year.
Aylesbury Ducks	7	7	Very good quality ; about the same as last year.
Pekin Ducks	14	11	Quality extra good.
English Pheasant	.....	1	
Golden Pheasant	.....	1	
Pigeons	187	207	Much better quality than last year.
Rabbits	12	12	A very good lot of lop-eared, Dutch and Angoras.
Canaries	.....	1	

Annual Meeting.

The annual meeting of this Association was held in Bowmanville on January 7th, 1892, the President in the chair. The minutes of last general meeting and Board meeting were read and adopted. The Secretary's report was taken as read. The Treasurer's report was read and adopted, as was also the Auditors' report.

Mr. A. Bogue reported for the Committee appointed to interview the Government

regarding increase of annual grant. Mr. Bogue stated the efforts of the Committee had been successful, and the grant had been increased by $300 and was now $900. If the Association gave value for amount received, the Government would not limit amount even to this but would still further increase the grant. A vote of thanks was tendered the Committee, and the thanks of the Association were ordered to be conveyed to the Government.

The locating of next exhibition brought many claimants. Mr. Bogue proposed Hamilton, seconded by Mr. Saunders; Mr. Myles proposed Toronto, seconded by Mr. Fox; Mr Kent proposed Kingston, seconded by Mr. Oldrieve; Mr. Mitchell proposed Milton, seconded by Mr. Main; Mr. Pequegnat proposed New Hamburg, seconded by Mr. McCormick. After considerable discussion on the various localities, Milton, New Hamburg and Toronto withdrew in favor of Hamilton, and it was finally decided to hold the show of 1893 in that city.

The following officers were elected: President, Mr. John Eastwood, Hamilton; 1st Vice-President, Mr. W. McNeill, London; 2nd Vice President, Mr. J. Dilworth, Toronto; Directors, Messrs. Jno. Cole, George Roach, P. H. Hamitton, Hamilton; D. C. Trew, Lindsay; J. J. Mason, Bowmanville; A. Bogue, London; W. Barber, Toronto; W. Goldie, Guelph, and G. S. Oldrieve, Kingston. Auditors, Messrs. H. B. Donovan and T. A. Duff, Toronto. Delegates, to Industrial Exhibition, Messrs. J. Dilworth and W. Barber, Toronto; to Western Fair, Messrs. Geo. G. McCormick and J. H. Saunders, London; Great Central Fair, Messrs. Jno. Cole and P. H. Hamilton, Hamilton. Messrs. Bogue, Dilworth, Mason and Doel were appointed a Committee to interview the Ontario Government with the object of getting a proper share of the grant to the World's Fair Committee placed on poultry. The Committee was given power to make all arrangements. The Board of Directors was given power to elect a permanent secretary and a permanent treasurer. Mr. R. Hamill was present to press his claims for salary as Secretary, due him since the show was held in St. Catharines, and it was decided that if any surplus remains after the expenses of the show Mr. Hamill be paid his claim, or if not in full whatever balance remains over.

Directors' Meeting.

At a subsequent meeting of the Directors held on January 8th, Vice-President McNeill occupied the chair. On motion Mr. J. J. Mason was appointed Secretary of the meeting. The Chairman explained the objects of the meeting were to elect a permanent Secretary and a permanent Treasurer, and to make arrangements to provide prizes for cross-bred fowls, dressed poultry, etc., and called for nominations. On motion of Mr. Bogue, Mr. T. Brown, London, was appointed Secretary, and on motion of Mr. Dilworth, Mr. G. G. McCormick, London, Treasurer; salary of Secretary to be $75 per annum, and that of the Treasurer, $25.

Moved by Mr. Dilworth, seconded by Mr. Trew, that the Association offer the following prizes on dressed poultry: 1st, $5; 2nd, $3; 3rd, $2; to be given for the heaviest and best in each class, fowls, turkeys, geese and ducks, entrance free, and breeders only to compete, not hucksters or dealers. Prize fowls to become the property of the Association. Carried.

It was decided to ask poultrymen to contribute essays on poultry to be read at the next annual meeting.

The Banquet.

In the evening the local Association tendered the visiting fanciers a banquet at the Bennett House, to which about one hundred persons sat down. In reply to the various toasts some timely addresses were given.

J. M. Hern,
Secretary.

FINANCIAL STATEMENT.

Joseph Jeffery, Treasurer, in account with the Poultry Association of Ontario, for the year ending 9th January, 1891.

Receipts.		Disbursements.	
Government grant (notes discounted in lieu of)	$582 25	Paid premiums	$828 00
Entrance fees	426 10	Printing	93 50
Membership fees	133 00	Advertising	24 00
Prize list advertisements	67 50	Judges	90 00
Special cash premiums	61 00	Salaries	100 00
Door receipts	15 75	Sundry expenses	164 38
Commission	1 00	Assets per statement	7 00
Donation, H. B. Donovan, *Review*	2 00		
" R. Bennett & Sons	4 00		
Rebate, Beeton Publishing Co	3 00		
Balance due Treasurer	11 28		
	$1,306 88		$1,306 88

Audited and found correct.

(Signed) Jos. Dilworth, H. B. Donovan, } Auditors.

ANNUAL REPORT

OF THE

EASTERN ONTARIO POULTRY AND PET STOCK ASSOCIATION

To the Honorable the Minister of Agriculture :

Sir,—I have the honor of forwarding to you a report of the proceedings of the Eastern Ontario Poultry and Pet Stock Association for the year ended 31st December, 1891 ; also an account of the exhibition held in the city of Ottawa, on the 19th, 20th, 21st and 22nd January, 1892.

During the year 1891 monthly meetings were held on the first Monday of each month, with the exception of July and August, at which discussions on matters relating to the advancement of the poultry industry were held and the views and opinions of the members were given. These discussions were of a practical nature, being the results of each breeder's experience of the strain of fowl he kept.

The exhibition was held on the dates above mentioned in the hall of the By-ward Market, which is a suitable place so far as the hall is concerned, but otherwise it is not in an advantageous position, being some distance from the principal streets. This in a great measure accounts for the small receipts taken at the door. People will not visit an exhibition unless the place is convenient and on a main street.

The Association, by judicious management, is now the possessor of some eighty double folding coops, each side of which is capable of holding a trio of the largest breed, and in addition to this are possessors of material to make one hundred coops. The folding coops are neat and compact, and an ornament to any exhibition. All the coops and other property of the Association are insured.

The entries at this exhibition are about the same as last year, and the various breeds especially Games, Game Bantams, Leghorns, Minorcas, Light Brahmas, Wyandottes (white and laced), Plymouth Rocks (barred and white), and Bronze Turkeys were fine and numerous, while the Dark Brahmas, Cochins, Geese and Ducks were not quite up to that of the previous year. A noticeable fact which speaks well for the Association, is the steady advance made by the local exhibitors. During the first two or three years nearly all the prizes were awarded to exhibitors from a distance, while now the local breeders, as will be seen by the prize list, divide the honors. Another marked and pleasing result at the last exhibition, was the number of entries and exhibits made by the farmers, and the success attending them. It has been one of the main objects of this Association since its organisation to encourage the farmer and those who raise poultry for market purposes to become not only members of the Association but exhibitors as well. The Association has always lent this class a willing hand by giving them every information in its power. They are now reaping the benefit of their endeavors, and the farmer and market producer are also in a more substantial manner realising the pecuniary benefit, for every pound of flesh they can add to the bird is so much more in their pocket. Amongst the exhibits were birds from Owen Sound, Whitby, Newcastle, Woodstock, Kingston, Brockville, Greenbush, Russell, Kenmore, Almonte and Carleton Place in Ontario. The province of Quebec was represented by birds from Montreal, Danville and Allan's Corners, showing that the exhibition was quite a representative one.

The judge was Mr. Thomas Smelt, Woodstock, who stated that the quality of the birds all through was very high. All birds not disqualified were scored, and fewer birds were disqualified than at previous exhibitions. All prizes were paid in full, a rule which prevails in the Eastern Ontario Poultry and Pet Stock Association, especially in the case of exhibitors from a distance, who are paid first. It is a gratification to the Association to have a number of letters on record from exhibitors speaking in the highest praise of the treatment and promptitude with which the prizes have been paid, and the care and attention given to their birds when on exhibition.

Several farmers made purchases of male birds so as to improve their stocks, and the addresses of breeders were given to others for a like purpose.

Before I draw this report to a close it may not be out of place to say a few words to exhibitors: There is always a class who are late in making their entries; in fact, some of them only breed one variety and wait to see if there are any entries for that variety. If they find only a few or perhaps no entries they ask if they cannot make an entry. This is often the case after the exhibition is opened and the judging commenced. If they are refused, they become quite indignant. This class of exhibitors, as a rule, are to be found amongst the first to complain. They little think of the annoyance and trouble they give to the Secretary and Committee, and how ridiculous they make themselves. I would say to them make your entries early and save yourselves and the Association annoyance and trouble.

I enclose a paper read by Mr. Benjamin at the last monthly meeting.

ALFRED GEDDES,
Secretary.

FINANCIAL STATEMENT.

P. G. Keyes, Treasurer, in account with the Eastern Ontario Poultry and Pet Stock Association for the year ending 30th September, 1891.

Receipts.	$ c.	Disbursements.	$ c.
To balance on hand from previous audit....	58 75	By amount paid for prizes.....	270 75
To amount received from members' fees.....	64 00	" " to judge.....	70 00
" " entrance fees.....	129 75	" " for labor	39 00
" " special prizes paid.	31 00	" " " coops.....	112 00
" " advertising in prize list.....	10 00	" " " printing	42 30
" " door receipts.....	48 23	" " " advertising and bill posting	10 00
" government grant.	300 00	" " " fuel and light	9 40
		" " " feed.....	6 60
		" " " insurance	2 00
		" " " postage and stationery.	20 98
		" " to Secretary.....	40 00
		" " for rent of coops.....	2 45
		" " " sundries	48
		Balance on hand as per bank book	15 77
	$641 73		$641 73

I, Emmanuel H. Benjamin, of the city of Ottawa, auditor for the Eastern Ontario Poultry and Pet Stock Association for the year 1891, do hereby certify that I have duly examined and audited the book and accounts of the Treasurer of the said society and find the same correct in every respect, and that the balance shown to be on hand agrees with the amount shown in the Treasurer's bank account.

E. H. BENJAMIN,
Auditor.

Ottawa, 31st October, 1891.

PROVINCIAL POULTRY ASSOCIATIONS.

By E. H. Benjamin, Ottawa.

The production of poultry, as compared with other classes of stock, is enormous, and if those interested in the success of agricultural exhibitions, and the various industries of the province of Ontario will give the matter of poultry raising their consideration, it will be seen that great wealth may be created in each county or agricultural division, and that every dollar offered as an inducement to improve poultry will be returned fourfold The Board of Agriculture and Arts should call a meeting of the poultrymen of the province, and discuss a proposition to have the government give a liberal grant towards a provincial association, and to encourage annual shows in the different sections of the province.

One of the difficulties poultry exhibitors have to contend with is the expense of reaching the agricultural fairs, express companies charging double first-class rates, while the premiums offered are so low as to be below the cost of getting the birds there, to say nothing of the fact that many exhibitors will receive no prize at all. I believe in offering liberal prizes to horses, cattle and other stock, but the prizes offered to poultry are too low, compared with the expense of reaching the exhibition Let the government make a liberal grant and divide it between the two associations, viz: The Ontario Poultry Association and the Eastern Ontario Poultry and Pet Stock Association, and that once in three years the total amount granted shall be funded towards holding a general exhibition at Kingston or some other central point, to be selected either by the Minister of Agriculture or a joint committee specially selected from the two Associations for that purpose. By adopting some such plan a great stimulus will be given to the poultry industry, and the amount granted will be returned to the province, by increased wealth, and increase in property twice the amount granted. Some people will say that the government give enough for such purposes. Do what you will you will find some people objecting to all appropriations no matter how beneficial they are: there is no industry that so completely belongs to the people, both city, town and country as poultry raising.

The production of poultry just now is attracting the attention of those engaged in this line of marketable stock, and if by improving the stock, an advance of one or two cents per dozen for eggs is obtained, and by care and judgment a pound or more flesh is added to each bird, the gain to the producer and to the province by additional income and value of property would be a handsome return for the amount voted. And with little additional care given to the poultry, all are benefited. This subject only requires a little judicious agitation and management to become popular and feasible.

POULTRY AT THE WORLD'S COLUMBIAN EXPOSITION.

The poultry exhibit at the World's Columbian Exposition at Chicago will be held from October 16th to 28th, 1893.

Prizes are offered on single birds as follows: $10, $5, $3, $2, v.h.c., h.c. and c., and on pens $10 and $5.

Intending exhibitors will find it to their advantage to send application for space to N. Awrey, M.P.P., Ontario Commissioner World's Columbian Exposition, Toronto, at as early a date as possible, in order that arrangements may be made with the Commissioners at headquarters for the necessary space.

The following are the rules governing poultry and pigeons:

Poultry.

All poultry offered for admission under an entry from the United States will be examined by a committee of three, who shall return to the exhibitor any bird which in their opinion is inferior, sick, out of condition, or which will not score 85 points in its class, according to the "American Standard of Perfection."

(*a*) No one exhibitor of poultry from the United States and Canada will be allowed to enter more than four birds, *i.e.*, one cock, one hen, etc., in any one class, and but one breeding pen in any one class.

(*b*) Poultry from foreign countries will be admitted under the rules governing the admission of fowls at competitive displays in said countries.

(*c*) Additional rules and regulations governing the poultry exhibit, and the system of judging to be adopted, will be issued hereafter.

Pigeons.

Prizes will be withheld where specimens are of inferior quality.

(*a*) Specimens must be named with what the exhibitor believes to be their correct title; all known synonyms (provincial or otherwise) may be added. Birds entered in a wrong class will be excluded from competition. All specimens must be exhibited in their natural condition; quality, beauty of plumage, purity of race and uniformity in markings, will be required in each instance.

(*b*) Entries shall consist of single birds of the following varieties: Pouters, Carriers, Short-faced Tumblers, Barbs, Fantails, Jacobins, Turbits, Owls and Russian Trumpeters. All other varieties shall be entered in pairs, one male and one female constituting a pair. Exhibitors will not be allowed to enter more than two specimens, *i.e.*, two cocks, two hens, etc., of any one color of each variety.

(*c*) All birds entered for competition must be the property of the exhibitor

(*d*) The right is reserved by the Chief of the Department of Live Stock to return to any exhibitor any bird offered for admission under an entry that in his opinion is inferior.

(*e*) Special rules, with the system of judging to be adopted in this division, will be issued hereafter.

POULTRY UPON THE FARM.

No one can succeed better with turkeys than the farmer, if he will bestow upon them a fraction of the care he gives his sheep and cattle. The turkey has been domesticated but a short time, as compared with other varieties of poultry, therefore confinement does not suit them, but give them the run of the farm, and while they do no damage to the growing crops, they do them much good by their destruction of insects, more especially grasshoppers, that frequently destroy whole fields of grain. When they can get these they require but little of other food, but they should be fed a little grain at night so they will be sure to return home to roost at night.

Fifty or more can be raised upon most farms each year without every missing what it took to raise them, and at Thanksgiving they will bring enough ready cash to buy the winter clothing for an ordinary family, or they will pay a year's taxes upon the farm. There are several varieties or breeds of domesticated turkeys, but we would place the Bronze at the head of the list, the White Holland making a good second. The Bronze is by far the largest. If the farmer will raise the pure-bred, of whatever breed he keeps, he can readily sell a part of his flock, at an advance over market prices, for breeders.

The goose is another variety of poultry that should be found upon most farms. In addition to their value as meat producers, each goose during the course of a year will produce a pound or more of feathers, worth about fifty cents a pound in market, and nothing makes a nicer roast than a good fat young goose. The Toulouse and Emden are the most popular breeds, they being the largest, and size is the principal object in breeding geese. They require but little care after they get once started, and if given a pasture lot, with plenty of water, their summering will virtually cost nothing.

We have many more breeds of ducks from which to select, viz.: Pekin, Rouen, Cayuga and Aylesbury, and many more, but these are the best for the farmer. They are large and mature early, and, if hatched early, and well fed, when six to eight weeks old, like the broiler, they command a better price than they will when fully matured. The duck is a heavy and promiscuous feeder, and to raise them profitably we must feed them

with a generous hand. Like the goose they yield feathers enough to give a good profit from them alone, if it should take all we get for the carcass to raise them. Then they are great layers of large well-flavored eggs, laying many more than the turkey, hen or goose. Neither the turkey, duck or goose requires expensive fixtures, and the cost of food and original stock is about all the expense the farmer need go to; there is big money to him in raising these as they are hardy, and if properly cared for, he will lose but few if any from disease.

Upon every farm are to be found a number of fowls called chickens, the majority of which are the old historical dunghill, a species that are too large to be called a Bantam, and too small to be a chicken. They are a bill of expense to their luckless owner, never laying except when eggs are the cheapest. If our farmer friends could be induced to build a cheap and comfortable house for their hens, then get a few of some one of the many improved breeds, they would find them a source of much profit, even more, for money invested, than their sheep, cattle and hogs. But they must have the same intelligent management that is given to all other farm stock.

If the farmer desires to raise fowls for eggs alone he should select the Leghorns, White Face Black Spanish, Minorcas or some laying breeds, and if he desires market poultry exclusively he should select the Dorkings, Asiatics, or some of the American breeds, all of which are good for that purpose. Should he desire both eggs and meat we would recommend his trying a cross-bred fowl. We think the following makes as good a cross as any to be had: A Black Leghorn cock bred to Langshan pullets; a White Leghorn to Light Brahmas; a Brown Leghorn to Partridge Cochins; and a Cuckoo Leghorn to either the American Dominiques, or Barred Plymouth Rocks. Chicks of either of these crosses will combine the laying instincts of the sire with the size of the hens and crossing as here recommended, the chicks will all be of one color, which adds much to their appearance when taken to the market alive. If we have a nice even lot of chicks, so near alike that we can scarcely tell one from the other, they will find a ready sale at an advance price over the mixed lot.

Every farmer should have, at least, one yard of strictly pure-bred poultry; the variety is for him to choose, not for us to dictate, for success with pure-bred poultry is largely a matter of fancy, and whatever breed we admire the most is the one for us to keep for we will give better care and attention, and that is just what determines the profit. The Leghorns being my favorites will do much better for me than they would for you who admire the Wyandottes; that both of us may be successful, you breed Wyandottes and I'll keep Leghorns. There are plenty of good breeds to select from, so get some pure-bred fowls at once.—"Trixie" in *Poultry and Stock Review.*

IN THE CHICKEN YARD.

For the first twenty-four hours after a chicken is hatched it needs no more food than has been provided for it by nature. The yolk-bag, which is absorbed into the abdomen just prior to the breaking of the shell, contains all the food needed for the time already stated. We believe harm is often done by forcing young chickens to eat, and it is not improbable that derangements of the stomach are set up by doing this, especially as rich food is often given.

When the proper time comes there will be no need to force eating. The cravings of nature will remove all necessity for that. But the hen ought to be well fed, and when the anxiety of her maternal trial is over she will be ready for and need something calculated to brace her up again. The whole question of feeding young chicks deserves the fullest attention, as upon it will largely depend the future of the birds. As already stated there has been a revolt against pampering, but it is necessary to see that the other extreme is not taken. One would be just as bad as the other.

We have always made it a practice to feed the chicks the first few days on chopped egg and bread crumbs, slightly moistened with milk, but we are fain to confess that we have seen chickens reared without egg at all quite as successfully as any of our own. There are those who say that chickens will do much better on hard plain food than with

egg and other such—as they describe them—dainties. We do not think that very early bred chickens would be reared without these kinds of food, but as to the later there would not be much difficulty with them as they can get plenty of insect life, which, it must be remembered, is their natural diet. We lay great stress upon this point.

Many failures in chicken-rearing are due to the absence of insects and ground worms or it may be to their excess, for one of the effects of contamination of the ground by fowls is that it becomes charged with minute life, of which there is either too much or it is of an injurious nature. The question is one that has not been studied out. We are familiar with the results, but are not certain as to the causes. If the egg food diet be adopted it must only be continued for a few days, say three or four days at most, when a plainer food should be substituted. Food should be given warm and a little at a time taking care that none be left to sour and derange the delicate stomachs of the birds.

The amount of space given to the chickens must depend largely upon how much is at command. The ideal manner of rearing chickens is to place the coops out in some nice sheltered place, sheltered to the north and east, but open to the south and allow the hens to go about where they like, of course arranging that the coops should be well apart. Where foxes and other pests of the poultry-keeper do not abound this is a good plan, provided that the hens are accustomed to full liberty. Then they will only go as far as the chickens can, and the whole arrangement is a beneficial one. But if the hens are usually kept in confinement to place them out in the open in this way would be most disastrous, for the old birds would so enjoy their liberty and be thinking of their own pleasure to such an extent that the poor chickens would have their strength overtaxed.

Many are lost in this way, and where the hens are usually kept in confinement it is desirable that they be restrained when in charge of chickens. There is also another point to be mentioned here, viz., that the habits of the hen and of her brood must be regarded. For instance, if a hen is set upon eggs laid by herself, or by hens of her own breed, she is not likely to overtax them so much as if of different breeds. If it is her nature to wander the chicks will have the same leaning. But if, say, a Game hen is put with eggs from chickens of any other of the less active races, the probability is that if given her liberty the hen may take them too far astray and thus overtax their strength.

These are matters which must determine the question of how much space should be given to the chickens, and if the happy mean can be secured all will be well. Theoretically, it is best to give the chicks as much space as possible, but there are limitations.

It is scarcely necessary to refer to the importance of cleanliness in the hen coops, feeding dishes, etc., but lest anyone might think these were unimportant we desire to remind the reader that want of attention to this point will be fatal to success. The coop ought to be thoroughly cleaned out every day, to have fresh soil placed in it, and to have the straw renewed two or three times a week. This, with a good lime-washing after each brood has been taken from it, should keep down insects which are so prolific a source of trouble.

Fowls can never thrive when infested with insects, and gapes is due to the presence of worms in the throat, the worms being in many cases the development of body lice. Some arrangements should be made whereby the hens with chickens can have a good dust bath every day. In the summer time, if at liberty, they can secure this themselves. As a rule, when the birds are about six to eight weeks old, the hen begins to get restless and neglects them. She and they must be watched about that time, or the result may be disastrous. So soon as she is seen to be leaving them it will be better to remove her to the laying house again, and make some other provision for the orphans. What this provision will be must depend upon the season of the year, and, to a certain extent, the nature of her chickens.

If the weather is warm and they are of a hardy race, they may be put at once into one of the fowl houses. In this case it will be desirable to provide special perches, for bent breast bones would result if they were allowed to roost on ordinary narrow perches. These special perches should not be less than six inches broad and have the edges carefully rounded off. At one time we used broad shelves, but the six-inch perches are in every way as good.

Some breeders do not permit their chickens to roost on perches until they are well

grown, but make a thick bed of sand or straw upon the floor. The objection to this is that so near the ground is generally draughty, and colds may probably result. In very cold weather, or in the case of the more delicate varieties of fowls, it will be necessary to provide more shelter for the deserted chickens, and for this purpose the best thing is what is known as a cold mother. This is a frame upon which canvas is stretched, and the canvas lined with flannel, or flannel strips suspended therefrom. The frame can either have end-pieces the required height to keep it from the floor, or it may simply rest upon bricks or blocks of wood. The size and height must be regulated by the number and age of the chicks which are to be accommodated. Chickens will nestle under and they will be much warmer than if they were without it.

A cold mother seems to be a most necessary part of the equipment of every poultry yard, where the raising of chickens is regarded as an important work. As a rule they will not need to be kept in the mother very long, it will be to their benefit if removed therefrom as soon as the weather becomes at all warm.

The division of the sexes is a matter which many breeders delay too long. In this matter it is not at all easy to define a time when it must be done, for the breeds differ much in the maturing of the chickens. We have always regarded as a sign that the proper time has come when the little cockerels begin to attempt crowing. We do not mean that if some cheeky, precocious fellow makes a vain attempt when five or six weeks old the division should then be made, but as soon as the crowing becomes pronounced it is time to do the work. It is better to err on the side of early than late division, and in the lighter breeds the chicks are usually ready in ten weeks, and in the heavier varieties a fortnight or three weeks later.—*Fancier's Gazette.*

POULTRY DISEASES AND NEGLECT.

One of the great drawbacks to profitable poultry raising, when especial attention is turned to it, is the many diseases to which the stock seem heir. In a majority of cases, however, the surroundings, the food and the manner of caring for the flock is the main cause of all the ailments, which are followed by great trouble and loss. Neglect in various ways is the starting point of many poultry diseases.

Allowing affected birds to continue without attention until, when they are "doctored" they have passed that stage where help or science can restore them, is an instance of this. A good flock master is a very observing one, for he not only knows each individual bird, but his quick eye detects at a glance when a specimen is in the least "off" condition. The comb—the great health indicator—he will at once notice is pale, or dark on the outer edges, and he knows there is a reason for it unfavorable to the bird's health; he may notice the bird, in another instance, is inclined to be unusually sluggish, or it will mope around, or the feathers will be somewhat ruffled, like a cross-setting hen.

Sometimes a fowl will show all these symptoms. He quickly notes them, and takes the bird and gives it attention at once; he does not postpone it, declaring, "If that hen is not better in the morning I must attend to her," as does the man who is always laying out plans for the morrow that never comes. Doctoring fowls without knowing what ails them is worse often than letting them suffer less and die in peace.

Nine-tenths of the diseases from which fowls suffer can be traced directly to vermin, body lice and the midget, or what is better known as the mite or nocturnal louse—the bed bug of the hen house. The first investigation that should be made on all drooping or ailing fowls or chicks is to carefully look for lice on the bodies, then search under the ends of the roosts, cracks, nests, etc., in the houses for the mites. If the hen house has been properly cared for, that is frequently whitewashed, the roosts and the places they are supported on coal-oiled occasionally, the nest contents burned and replenished with clean straw, and the boxes kept whitewashed, perhaps no mites will be found. Then it would be well to diagnose the case.

If, however, the cause is found to be lice the house must be thoroughly cleansed and the fowls also. The methods mentioned above must be at once resorted to in the house and the "sick" bird and all the flock must be treated. Insect powder must be freely

dusted in the plumage, not on it. Raise the feathers of the back and other portions of the body by pulling them contrary to their natural way of lying, and freely dust with insect powder. Use melted lard under the wings, on the head and over the vent. In the latter place an expert will readily part the feathers and find the lice in numbers and quickly treat them to a lard bath from the end of his finger which effectually does for them.

Bumble foot in the heavy breeds—caused by high roosts—should be doctored by lowering the roosts to within two feet of the floor. In cases of bowel complaints investigation will often show either poor food, or that an excess of bran or other loosening food is being given. Often a change of food will check the trouble; if not, the food should be mixed with scalding water in which enough Jamaica ginger has been added to give it a bluish-milky tinge.

Constipation often results from an excess of grain, or a one grain diet, where fowls are yarded, and can only get such food as is given them. In such cases a supply of green food daily will cause a change. Roup, canker, sore throat, scabby head, and pip are all caused by neglect and laziness of the flock owner, or at least most of them. A hen house into which the sun can never shine induces these troubles, as do also impure drinking water, damaged grain, houses badly ventilated where the droppings are allowed to accumulate.

If there are lice on the fowls, such birds owing to their lack of vitality from being preyed upon, are very susceptible to roup, and soon die with it. Crowding large flocks in illy-ventilated houses is another source of disease. These are a few of the diseases resulting from gross neglect in the poultry yard, and more can be accomplished by the proper observance of the things that prevent the appearance of all these troubles than by doctoring affected fowls.—*Baltimore Sun.*

FEEDING.

There is probably nothing better and cheaper for feeding fowl than corn; this is the main stand-by with farmers. Variety is desirable, but chickens that have their liberty secure this for themselves in the yards and fields around the premises; usually they are not backward in helping themselves. Where the ground is overstocked the poultry will suffer for want of a change of diet and other food must be supplied.

Wheat can be profitably fed to both old and young stock. Even at the present prices of good wheat it does not pay to buy screenings; indeed the farmer could hardly afford to use them if they could be had for the carting, on account of the great quantity of foul seed they contain. Oats and rye are only to be recommended for occasional feeding. Good, heavy oats will do very well when fed with other grain. There is too much chaff about ordinary oats, which tends to produce a crop-bound condition. We would not feed oats to young stock, except when ground and the hulls sifted out.

Small white and sweet potatoes afford a cheap food, and pay better for chicken feed than they do when fed to the pigs. Unmarketable vegetables, such as cabbages, turnips, beets, etc., can also be used to advantage in the poultry yard. Surplus watermelons and cantelopes split open in the middle and set out to the fowls will be heartily appreciated.

As to the preparation of food, we prefer to feed wheat whole, and to fowls in confinement it is better fed on the straw. Corn should be fed whole or cracked, the fine meal being sifted out. Oats we would feed in the sheaf or grind, sift and mix with corn-meal. A large proportion, two-thirds at least, of all food we would supply dry. The healthy fowl has a feed mill capable of working up almost anything softer than quartz pebbles, and we think it a good plan to keep the mill sharp and in good order by constant use. Soft food given frequently will shortly weaken the digestive apparatus. For chicks or fowls that are being fattened, or for forcing laying hens, when after results are of no importance soft food is just the thing, and may be given exclusively.

Potatoes are in their best condition for feeding after boiling and when warm; they are not so good after they have become cold and soggy. It is a good plan to mash them

up while hot, with corn-meal. Potatoes fed too freely will produce indigestion ; one light meal each day is enough. It is best to boil all vegetables in the summer and fall or as long as grass abounds. A little meal boiled in a pot with them, and the whole mixed with cornmeal, will make them more acceptable to the fowls.

Meat need not be supplied to fowls while they can obtain worms and other insects. But where the flocks are large and there is only a daily ration of a bug apiece, it is well to furnish it. Lean meat is preferable to that which is mostly fat.—"GRANITE STATE," *in the American Stock-keeper.*

CARE OF POULTRY IN WINTER.

As I half-way promised you some time ago that I would give you some poultry notes for publication, I will now do so.

Cold weather is the time when most people complain that their hens don't lay. The winter quarters for fowls should be made warm and as comfortable as possible by making their houses perfectly tight on the north, east and west sides, at least. The south side, which should be the front, may be partially open, in order that the fowls may receive a sufficient quantity of pure air.

The floor of the poultry house should be of earth, and raised several inches above the outside surface, in order that the house be kept perfectly dry, as dampness is very injurious to the health of poultry.

The fowls should be fed twice a day. The morning feed should consist of one-half each—in bulk—cornmeal and wheat bran, which should be thoroughly scalded with boiling water, in order to partly cook it ; but only boiling water enough should be used to thoroughly moisten it all to a consistency that it will cleverly stick together. This should be fed warm, and in order to prevent waste I feed in troughs. If you desire to get eggs in large quantities add about a pound of meat scraps to each two gallons of dough as animal diet is the best food to stimulate laying to any considerable extent. When feeding animal food add two tablespoonfuls of cayenne pepper to two gallons of dough one morning, the same quantity of salt the next morning, about a gill of pulverized charcoal the next morning, etc., etc. During severe cold weather feed corn one evening, and wheat screenings and oats mixed the next ; and during mild weather, corn one evening oats the next, wheat screenings the next, corn the next, etc. When the fowls can get no green food a few cooked potatoes should be added to their morning food, or a few heads of raw cabbage given them two or three times a week. A liberal supply of gravel, as well as fresh pure water should be kept within their reach at all times. There is no live stock on the farm more profitable than a choice variety of poultry properly cared for. Poultry well cared for will pay their keeper handsomely. Try it for a year and be convinced.—"G. P.," *in American Stockman.*

HOW TO FATTEN FOWLS.

If we have learned that it pays to fatten fowls designed for the market much better than it does to sell them when lean and scrawny, we, if we are sensible beings as most poultry men are, shall be interested in knowing how to make our poultry fat.

Probably improvement has about reached its limit in fattening fowls in the processes adopted by French and English feeders, but as their methods require special apparatus and the process known as cramming, and as poultry breeders in this country are hardly as yet prepared to take up a method, which is a business in itself, we do not deem it advisable to discuss the processes of cramming. What we wish to know is, how, without special apparatus and without more labor than we employ upon the care of our stock ordinarily, we can make them fat enough for our markets.

The first principle that we ought to enforce is that our chickens should be so fed from the shell up that they will be well nourished, and in not a bad condition to kill at

any time. This can be obtained by liberal feeding upon such foods as are employed by successful breeders, who annually raise fine specimens. The subject of feeding chickens we may discuss in a future article ; all that we desire now to say upon the subject is that our fattening process should really begin when the chickens are first hatched and be continued during their growth.

But having done this, the chickens are thus susceptible to much improvement. Considerable gain in flesh, fat, and, of course, weight, can be made in a short-time, and the chickens will sell better and for more money per pound in consequence thereof.

One of the most successful fatteners of chickens I know is a lady, and her method is so simple as well as effectual that I think it well to make it known. She has some coops about ten feet long by five feet wide, boarded up on three sides and roofed over, the fronts being made of lath nailed longitudinally. These coops are comparatively dark, still there is light enough for the chickens to see well. Into such a coop she places about twenty cockerels and feeds them upon whole corn. This is the only food they get. They have fresh water supplied to them twice daily. In about three weeks they are ready to kill, and they are usually very plump, fat, and heavy.

Corn in some form, either whole, cracked, or ground into meal, is one of the best foods to use in fattening fowls, as an analysis of its constituents shows that it possesses a large proportion of the elements that enter into the composition of adipose tissue.

While this lady's plan is a good one, I think it can be improved upon, and I suggest from experience and observation the following substitute : Coop the chickens in a quiet place with but moderate amount of light. See to it that they are free from lice, as lice hinder the fattening process. Feed for the morning meal a mush made by cooking corn meal and potatoes together, about two parts meal and one part potatoes. Feed whole corn late in the afternoon. Keep plenty of fresh water before the chickens until the last week During the last week of the fattening process remove all the water and give for drink sweet milk further sweetened by stirring in two tablespoonfuls of sugar to each pint of the milk. Give no other drink. A little lean meat during the process will be a valuable addition to the bill of fare, as it will help to keep up the appetite as well as furnish food, so that the chickens will eat and digest more than if this is not given. By feeding the chickens in this way for three weeks they will be plump and fat, and should then be killed promptly. After a time, if the process is continued too long, the chickens will lose their appetites, and then a loss in weight will ensue.

By this special feeding the profits of the poultry raiser will be greatly increased, while the additional cost will be but a small matter compared with the amount gained in weight and price per pound.—*Silas Bevan in the Poultry Monthly.*

AN OBJECT LESSON FROM THE MARKET.

"I'll give you ten cents a pound for the lot if you'll get them here to-day," said a poultry dealer in Boston, in whose office the writer was sitting one day recently. The other listener was a farmer from a neighboring town who wanted to sell his fowls alive.

"But you said you were paying eleven cents," said the farmer.

"I said I was paying ten and eleven," said the dealer, "according to the quality. I paid eleven for a lot this morning, but I went to see yours yesterday, as I promised, and I must say it isn't a promising lot of fowls."

"I think they're good fowls," said the farmer.

"Of course you do," replied the dealer; "but I have to judge by how they will dress off. How old are they, for instance?"

"Oh ! there are some a year old, and some two."

"Yes, and some three and some four, ain't they ?"

"Well, not many as old as that. You see they're all in together and I can't just tell which are last year's and which year befores."

'That's just it," said the dealer ; "you can't tell, neither can I, and they've all got to go for old stock. Then they're everything and anything—regular scrubs—eh ?"

"Well, they're not thoroughbreds. I can't afford to keep thoroughbreds!" said the farmer.

"Possibly not," replied the dealer; "but how if it made the difference in price you're haggling for, and if the fowls when dressed weighed two or three pounds more per pair?"

"There'd be more to sell, of course," said the farmer.

"Yes, and 'twould be a good deal better stuff when dressed," said the dealer. "Now look at some of these fowls in the chest," (walking to the chest). "There's a pair such as I am glad to pay 11 cents for, and here's a pair which I paid 10 for when alive. Look at the difference! which pair of fowls would you take now, if you were buying your Sunday dinner?"

"But you don't sell them at the same price," said the farmer.

"Certainly not. That pair will go quick at 18 cents a pound and the other pair we ask 15 cents for, and get it if we can, but they are 'stickers,' nobody wants them even at a low price. That best pair weighs nearly ten pounds, say nine and a half, and call it $1.71; this pair weighs strong seven pounds and at 15 cents a pound calls for $1.05. Which would you take?"

The farmer's eyes rested appreciatively on the pair of plump, full breasted, yellow-skinned birds, and then turned to look at the thin, blueish-tinted skinned birds beside them, "There's a difference," he said, "but then, there's a difference in price."

"Of course," replied the dealer, "but don't you think the best would be cheaper in the end? Don't you think, now, that you'd rather have one of those good birds than that pair of old crows? I would," the dealer continued, "for I know there's more eating and better eating in one of those birds than in both of these, and the public knows it, too, and buys the better stuff. In other words, stuff like that sells quick at 18 cents, and those old pelters go hard at fifteen cents and possibly fourteen cents. That's why I'd rather pay you eleven cents for good fowls than ten for the stuff you've got. You say you can't afford to keep thoroughbreds, but look at the difference. You've got about a hundred hens that will weigh about five pound apiece alive; call it 500 pounds at 10 cents makes $50. If you had good stuff like those I bought yesterday your hundred would weigh 650 pounds, probably, and bring 11 cents, which is $71.50. There's $21.50 difference! Over forty per cent."

"Yes, that looks well in figures," said the farmer, "but they cost so like tarnation."

"Have you ever tried it?" we asked, thinking it time to join in the talk, to which, up to this time, we had listened eagerly.

"No, I've never tried thoroughbreds, but you 'fancy' breeders ask four or five dollars a setting for your eggs and I can't afford it!"

"Oh, no! That's the 'fancy' price," we replied. "You can get just as good eggs as any one need have who doesn't want to breed for fancy for a dollar a sitting, and three or four sittings should give you a pen of good pullets to breed from next year and the second season should see your stock all thoroughbreds."

"Yes, and something that I should be glad to buy at eleven cents a pound alive," said the dealer. "I'm not preaching up fine stock," he continued, "it's none of my funeral, but I know what the people coming to market prefer, and I know I can make a better penny—and a quicker one—on birds like that than on the scrubs and so I'd rather have them."

"And they'd lay better, too," we chipped in. "Not only would they pay better when selling to the dealer but they would pay you better in eggs all winter and spring and summer and fall; in fact, good stock would pay you double the profit of your scrubs, taking one year with another."

"Well, I dunno," said the mystified farmer. "But you'll give me 10½ cents for those hens, won't you? That's sort of splitting the difference."

"Can't do it, my friend," replied the dealer. "I don't care, honestly, whether you bring them or not; they'll go hard; they'll dress off just like those things, and you wouldn't buy 'em yourself, you know you wouldn't!"

And the farmer "went away sorrowing."—*A. F. Hunter in New England Farmer.*

PIGEONS.

To those who have not considered the subject from a scientific point of view, it would appear almost incredible that all the numerous varieties of fancy pigeons, varying as much as they do in size, form, and color, should be descended from one wild original; yet, if one fact more clearly than another is made out in the history of our domestic animals, it is that the common blue rock pigeon, a native of the most inaccessible part of our coasts, is the progenitor of every species of fancy pigeon. The late Mr. Charles Darwin, in his large work on variation in animals and plants, fully demonstrated the fact that no other bird could have had any share in the origin of our domestic pigeon, and he showed by a series of experiments, in which I had the pleasure of assisting him, that by mating together the most extreme varieties, however dissimilar in form and color, they would, after a few generations, revert more or less completely to their ancestral type, and show the blue color and black-barred wings of the blue rock.

My acquaintance with Mr. Darwin commenced at a pigeon show, held many years since in the great room at Freemasons' Hall, when Mr. Yarrell, the well known ornithologist, who had known me as a boy, introduced me to a stranger, saying: "Oh, Mr. Darwin, here's Tegetmeier; he will tell you what you want to know."

Our introduction resulted in an acquaintance which endured during the lifetime of the great naturalist, who availed himself of the very considerable collection of specimens that I had made, illustrative of the variations that occur in domestic birds.

The rock dove, the *Columba livia* of naturalists, is a bird that is very generally distributed over a great part of the world; in Europe it is usually found inhabiting the coasts, where it can find the shelter of deep caves; in Palestine it is abundant on the coast; in North Africa it is commonly found; it also occurs in the Azores, Madeira, St. Helena, and other African islands; in Asia, it is found in Persia and India in large flocks, in holes, in wells and large buildings. In Ceylon it is so numerous that there is an island called Pigeon Island.

There is little doubt of the identity of the species that inhabits these different localities, although there are slight variations in color, the Asiatic species being without the white on the back which distinguishes our European race. This wild bird is one of the few animals that admit of being domesticated or attached to the homes of men. Many wild animals can be tamed, but their offspring revert again to a wild condition; some few on the other hand, become attached to man, and remain with him as domesticated animals.

Of these, the rock dove, or pigeon, is one of the most remarkable. As it has been readily domesticated, from the influence of the new surroundings, and from the care of man in breeding from any special variation that might have made its appearance, a number of varieties have been produced.

The English fanciers, up to a very recent period, essayed to breed pigeons with marked difference in form, and they devoted their attention chiefly to what they termed high class varieties. Of these, the principal were short-faced tumblers, fancy carriers, and pouters.

The aim in the first breed was to produce an exceedingly diminutive bird with a very short beak, globular head, and a peculiar arrangement of the colors, which, in the choicest specimens, termed almond tumblers, were chiefly black and yellow.

In the breed known as fancy carrier, size on the other hand, was desired, with great length of beak, length of neck, and length of limb; while the ring of white skin which surrounds the eyes and that which covers the nostrils were enormously developed, so as to produce what are termed the wattles of the carrier.

In the pouter, on the other hand, another development was aimed at. The pigeon naturally has a tendency to blow out the upper part of the gullet and the crop, inflating them with air as it coos to its mate. This tendency was seized upon by the fancier, who bred from the pigeons that shewed this to the greatest extent, and so gradually succeeded in producing a breed in which the crop could be inflated so as to equal in size the whole of the rest of the body, and in this way was produced the pouter, or cropper.

It is a remarkable illustration of the variable condition of animal structures that out of the same wild original can be produced the long, thin, narrow-necked carrier and the pouter with its crop double the girth of its body. In both these breeds the limbs and feathers are long. This depends upon a fact that was demonstrated by Darwin, that there is a co-relation between the lengths of the different parts, and that it would be impracticable to breed a bird with a long neck and short limbs, or the converse.

Until pigeon keeping became, I may say, fashionable, the tumblers, the carriers, and the pouters were the most valued breeds of the British fancier; all the other varieties at that time were included in the somewhat contemptuous term of "toys." About fifty years ago several German breeds came to the front. These were more remarkable for the distribution in the colors in the plumage. Some, like those now termed 'magpies," had colored bodies and white wings; others, like those now known as "swallows," had dark wings and light bodies. The "nuns" had dark heads covered with a turned crown. Then there were numerous birds known as German "toys," in which all kinds of patterns were produced by careful breeding. Every country, in fact, had its own modifications, requiring careful breeding to produce.

From Russia came birds called "trumpeters," from the sonorous character of their coo, distinguished by tufts of feathers in their crowns, so large as entirely to conceal the head, the eyes, and the beak, and also characterised by the legs and feet being covered with feathers.

As in many other cases, the geographical names given to birds were incorrect; there is a breed with a wonderful metallic sheen upon the feathers, which, absurdly enough, are called "Archangels," although there is no doubt that they did not come from that locality. In fact, when geographical names are given to animals, it usually happens that the name selected is that of the place from whence they were last brought; hence the absurd errors which usually characterise the names of races. Our Cochin China fowls do not come from Cochin, but from Shanghai, a place hundreds of miles away. Our little black ducks have received three names—Buenos Ayres, East Indian, and Labrador—a safe proof, if any were wanted, of the absurdity of geographical names as applied to animals, the truth being that they are merely varieties of our own wild duck.

In India, the blue rock has been domesticated and carefully bred for thousands of years, and some very remarkable products have been the result of the care exercised in selection by the Oriental fancier. Some of the best of our fantails—the breed in which the number of feathers in the tail is increased to thirty or even forty—came from India; and to show the care which has been bestowed upon the bird there, I may state that there are varieties in which the two sides of the bird are of different colors.

In North Africa a very remarkable breed exists, termed the booz pigeon, characterised by its extremely small size, excessively short beak and round head; these are now known in England under the title of African owls. Previous to their introduction, a breed termed owls, or the owl pigeon, had existed in England; it was so called from the shortness of its beak, bearing some resemblance to the bird from which its name is derived. A breed that is very much like the owl is known as the turbit, which, even as late as fifty years ago, had a totally different form, being bred with a flat skull, and termed frog-headed. Fashion, however, has altered, and the modern turbit has assumed the short head and short beak which characterises the owl. The same singular formation has also been introduced into the breed which in this country is called the Antwerp, a bird almost unknown in the city whence it takes its name.

Some varieties of pigeons are valued for the strange distribution and arrangement of the feathers. Among the most remarkable of these are the Jacobins, in which the feathers of the sides and back of the neck form a kind of hood, which, when the bird is at rest, almost entirely conceals the head; the origin of the name here is evident as having been suggested by the hood or cowl of a Jacobin monk.

The instinct of the pigeon to return to its home is very remarkable. It exists in the wild bird, or blue rock, and has by careful selection, been greatly developed and even increased in certain domesticated breeds. But the varieties that are now termed carriers by the fanciers are not worthy of the title; they are mere fancy breeds, bred

for show points and exhibition purposes, the most valuable specimens never being trusted out of the aviaries in which they are reared. The true messenger pigeons are now termed "homers," or, in Belgium, where the breed originated, *voyageur* pigeons. These are not reared to be any special color, but are selected solely from their powers of flight and their ability to return home long distances.

The process of selection is one of a ruthless character; the young birds are trained by gradually increasing distances up to as far as a hundred and fifty or two hundred miles during their first year, when those that are not good homers are lost, and the best only return home and propagate their species. In this way a race of birds has been obtained that can be depended upon for returning from immense distances. Flights have taken place from Rome to Brussels, and races are now flown from France to England.

The utility of the homing pigeons during the seige of Paris in the Franco-German war is well known. The birds were sent out in balloons, and carried intelligence back to the city, in spite of all the efforts of the beseigers to intercept them. This performance demonstrated the utility of homing pigeons during war, and the governments of France, Germany, and Italy have establishments of homers that will convey messages back to the fortress or place where their services are required.—*W. B. Tegetmeier, in the Illustrated London News.*

ANNUAL REPORTS

OF THE

SHEEP-BREEDERS' ASSOCIATION

AND

SWINE-BREEDERS' ASSOCIATION

OF THE

PROVINCE OF ONTARIO

1891

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1892.

ANNUAL REPORT

OF THE

DOMINION SHEEP BREEDERS' ASSOCIATION.

To the Honorable the Minister of Agriculture:

I have the honor to submit herewith the third annual report of the Dominion Sheep Breeders' Association.

Your obedient servant,

F. W. HODSON,

Secretary.

LIST OF MEMBERS.

Name.	P. O. address.
Breeders of Shropshires:	
Allin, Samuel	Bowmanville.
Baird, George	Clinton.
Beattie, W. H	Wilton Grove.
Bridgeman, W. B	Smithville.
Brown, Alfred	Bethel.
Calder, Charles	Brooklin.
Conworth, John	Paris.
Davies, Robert	Toronto.
Dryden, Hon. John	Brooklin.
Errington, Fred	Glanworth.
Fraser, Thomas	Brucefield.
Gibson, Richard	Delaware.
Hanmer, D. G	Mount Vernon.
Hawkshaw, W. S	Glanworth.
*Hutchinson, J. P	Moosomin, Assa.
Leask, James	Taunton.
Ledger, A	Burford.
Lewis, James	Thornbury.
McEwen, Malcolm	Clinton.
McFarlane, James	do
McIntosh, Peter	Cassbridge.
McMillan, A	Lorneville.
McNaughton, W. J	Lancaster.
Medcroft, Wm	Sparta.
Miller, Robert	Brougham.
Phin, James P	Hespeler.
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‡Gowanlock, Robert	Maple Hill.
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Laidlaw and Jackson	do
Linton, Wm	Aurora.
‡McCrae, D	Guelph.
§Neville, C. W	Newburgh.
Petch, Wm	Blackheath.
Prout, George	Zephyr.
Russell, James	Richmond Hill.
Slater, John	Buttonville.
Smith, Wm	Columbus.
Snell, J. C	Edmonton.
Snell, J. G. and Bro	do
Thompson, John	Uxbridge.
Thompson, Wm	do
Ward, Joseph	Marsh Hill.

Name.	P. O. address.
Breeders of Leicesters:	
Blais, A. J	Glen Sandfield.
Campbell, Colin	Crosshill.
Campbell, Jas. & J. K	Palmerston.
Campbell, M	Northwood.
Currelley, T	Fullarton.
Garnham, E. A	Straffordville.
Harkness, A. D	Irena.
Jeffrey, Alex	Whitby.
‡Jeffs, E. & Sons	Bondhead.
Kelly, John, jr	Shakespeare.
McEwen, J. D	Falkirk.
Martin, R. G	Marysville.
Parkinson, L	Greenock.
Thompson, Adam	Shakespeare.
Thompson, James	Mildmay, box 24.
Thomson, Joseph	Salem.
Whitelaw, Wm	Guelph.
Breeders of Horned Dorsets:	
Benningstiff, F. W	Greenville, Pa.
De Arman, S. S	Franklin, Pa.
Dodge, A. M	Waubashene.
Harding, R. H	Thorndale.
Hector, T. W	Springfield on Credit.
McGillivray, J. A	Uxbridge.
Mitchell, A	Springfield on Credit.
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Rolph, Wm	Markham.
Tazewell, John	Port Credit.
Weld, S. W	Calder.
Wright, W. A	Waubashene.
Breeders of Southdowns:	
Anderson, James	Guelph.
Dale, David	Glendale.
Douglas, T. D	Galt.
Jackson, John	Abingdon.
Lemon, S	Kettleby.
Martin, Wm	Binbrook.
Shaw, Robert	Glanford Sta.
Simenton, Arthur	Blackheath.
Breeders of Oxfords:	
Arkell, Peter	Teeswater.
Birdsall, F. & Son	Birdsalls.
Campbell, J. L	Simcoe.
Dickeson, Wm	Mildmay.
Harcourt, J. F. & Son	St. Anns.
Tolton, James	Walkerton.
Wright, Herbert	Guelph, box 47.
Breeders of Lincolns:	
Geary, John	London.
Gibson, John T	Denfield.
Oliver, Wm	Avonbank.
Stevens, R. W	Lambeth.
Walker, Wm	Ilderton.
Breeders of Merinos:	
Bailey, Rock	Union.
Smith, W. M. and J. C	Fairfield Plains.
Miscellaneous:	
Hallam, John	Toronto.
Hobson, John I	Mosborough.
Hodson, F. W., (Secretary)	London.
Simmons, C. M	Ivan.
Wade, Henry	Toronto.
Ont. Agricultural College	Guelph.
Dom. Experimental Farm	Ottawa.

*Also of Merinos. †Also of Horned Dorsets and Oxfords. ‡Also of Southdowns. §Also of Leicesters.

ANNUAL REPORT

OF THE

DOMINION SHEEP BREEDERS' ASSOCIATION.

THE FALL MEETING, 1891.

The Fall Meeting of the Association was held in the Board Room, at the Exhibition Grounds of the Toronto Industrial Exhibition Association, on the evening of September 16th, 1891, the President, Mr. Robert Miller, of Brougham, in the chair. The meeting was called to order at 7.30 o'clock.

At the suggestion of the President, the minutes of the previous meeting were adopted without reading.

SHEEP RECORDS.

The PRESIDENT.—Those gentlemen who were present at our last meeting will remember that a resolution was passed pledging the Association to endorse and sanction any action which might be taken with a view to starting a record in this country for any particular breed of sheep. It appears that our breeders are not recognised in the states as they ought to be, and if there are any breeders here with a grievance, we would like to hear them so that if possible we may help them to remedy it.

Mr. DAVID MCCRAE, Guelph.—What records have been started?

The PRESIDENT.—I do not know that there are any breeds of sheep being recorded in this country at the present time except Horned Dorsets. I believe that Mr. Jackson has a report from the committee appointed to examine into the advisability of starting a record for Southdowns.

Mr. J. JACKSON.—The members of the Association will remember that at our last meeting, Mr. Douglas, Mr. Shaw and myself were appointed to investigate this matter. We have the following report to make:

REPORT OF COMMITTEE

To the President and Members of the Dominion Sheep Breeders' Association.

Your committee appointed to report on the advisability of establishing a Record for Southdown sheep in Canada beg leave to make the following report.

Whereas the American Southdown Association has taken off the fee of $5 for recording imported sheep—applying the same rule to imported animals as for those bred in America.

And whereas we have good reason for believing that in the near future the fee for recording lambs at least will be reduced to 50 cents.

And whereas—the United States is now, and will be for many years to come, our best market for pure bred sheep.

We would recommend and urge upon breeders of pure bred Southdown sheep in Canada the advantage of recording their sheep in the American Record.

We can also recommend it as a carefully conducted Record, with a solid financial basis—and although the membership fee of $10 may seem a little high it belongs to and gives a degree of strength to the Association which can be used to advantage.

We would further submit that if a record were established in Canada it should be entirely under the control of the breeders and not of the Agriculture and Arts Association.

That the standard of entry should be as high or even higher than that adopted by the American Association.

That it would be necessary to have an executive committee to take control of all matters pertaining to its affairs and to ensure a solid financial standing there would have to be a membership fee of at least $5, and the entry fee should be high enough to ensure sufficient funds to meet all expenses with something to fall back on.

All of which is respectfully submitted.

JOHN JACKSON
ROBERT SHAW } *Committee.*
T. C. DOUGLAS

TORONTO, Sept. 16th, 1891.

Mr. JACKSON.—One grievance we had has lately been removed, viz: the fee of five dollars which was charged by the American Southdown Registry Association has been removed. This was the greatest grievance we had so far as I can see. Now that it has been removed, for my own part I would prefer not to start a record.

The PRESIDENT.—This Association has been of great assistance in helping the Southdown breeders to get their grievance removed. No doubt it was a heavy burden to tax them $5 for each sheep they imported. We resolved last year that we would sanction any move they liked to make in the matter, and perhaps that resolution itself has been the means of helping them to accomplish their end. We feel very pleased if such is the case. If there are any other breeders with grievances I think it would be well for them to state what they are, and if we think it advisable, we shall certainly endorse any action they may take. I understand that Mr. Geary wishes to say something on behalf of the Lincoln breeders.

Mr. J GEARY.—I would like to say a few words. The Lincoln breeders are very few in number as yet in this country. I have taken considerable trouble to enquire into the established record, and I find it is of such a nature that it would be of very little use—in fact no use—in view of the action taken by the custom authorities in regard to some of our Canadian records. They seem willing to register almost anything that traces to a Lincoln sheep on one side. Such a record is of no use. Take for instance the Goderich record for horses. It is not recognised at the Customs at all because it only traces to imported stock on one side. On behalf of the Lincoln breeders I will move that I think it is important that steps should at once be taken to establish a record for their own particular breed of sheep.

Mr. WILLIAM OLIVER, Avonbank, seconded the motion.

The PRESIDENT.—This is hardly a question to bring before this meeting, I think, but it will be safe to say to the Lincoln breeders, as was said last year to the Southdown breeders, that if they will unite together and take concerted action to rectify what is wrong, this Association will endorse their action and give them all the assistance it can. I believe it is agreed that we are met together to help one another, and if they will only take action in the matter, I think I am safe in saying that they may count upon our assistance. There is no doubt that what Mr. Geary says is correct, and I think that something should be done to remedy the present unsatisfactory state of things. A

breed of sheep is certainly very much handicapped unless it is carefully recorded in Canada and the United States just now.

The following resolution was then moved by Mr. Geary, seconded by Mr. Oliver, and carried: That the Dominion Sheep-Breeders' Association thinks it is desirable that the breeders of Lincoln sheep should start a record for the Dominion of Canada.

The next thing on the programme was the appointment of a committee to meet with a committee from the Agriculture and Arts Association, to consider what steps should be taken in order to ensure a representative display of live-stock, etc., at the World's Fair.

Mr. F. W. Hodson.—I might say that delegates from the different live-stock associations are to meet with the Agriculture and Arts Association to morrow evening, with this end in view I had received a letter from Mr. Wade saying that two of our number are to be selected to meet with them.

The President.—I am fully in accord with the suggestion of the Agriculture and Arts Association, for I think it is time that some preliminary steps should be taken in this matter so that we may have some idea what the Central Committee proposes to do, and prepare ourselves accordingly. I think it would be in order that the delegates be proposed for this purpose.

It was moved and seconded that Messrs. McGillivray and Jno. Jackson be the delegates to meet with the committee of the Agriculture and Arts Association. Carried.

ALD. FRANKLAND'S ADDRESS.

The Chairman then called upon Alderman Frankland to address the meeting. Mr. Frankland spoke as follows:

Mr. President and Gentlemen: While I have been sitting in this room to-night I have again come to the conclusion that we ought to have an agricultural hall where breeders of sheep and of other animals as well, and those engaged in growing cereals, might meet together in a building of their own, better suited to their requirements than such a place as this, and where they would not be disturbed by the music and noise to which we are subjected to-night. During the past few weeks it has been intimated to me that the Mutual Street Rink could be purchased for $22,000. A friend of mine said to me yesterday that he would willingly contribute one thousand for such a purpose; and he is not a farmer either. I am sure the city of Toronto would be willing to declare it free from taxation. If such a plan were carried out, we would have a building of our own where our farmers and breeders of stock might meet together to exchange views and get information that could not be obtained in any other way. If I do no more good than to create a want in your minds for an agriculteral building adapted to the requirements of farmers' meetings such as this, I shall feel that my time has not been ill-spent this evening. Every little market town in Great Britain has a building devoted to this purpose, and surely our Queen City should have such a building.

I came here this evening at the request of gentlemen interested not only in their own but in the welfare of the farmer generally. I believe that the gentleman who spoke to me was Mr. Hodson of *The Farmers' Advocate*. In my opinion the *Advocate* is a very good agricultural journal. It is appreciated in many parts of Great Britain too, for I have the pleasure of sending copies there myself nearly every month.

What I particularly wish to say to-night is that we have now almost reached the zenith of what we have been looking for since we first attempted to export animal freight to Great Britain. You are all aware how near we were to losing the position which we have held since 1874 through the propositions of certain parties who approached the Dominion Government for permission to slaughter cattle at Three Rivers. My attention was first called to this by a speech of Mr. Abbott's; and as the export of cattle and sheep are so closely connected, I will explain the steps which have been taken in defence of our privileges: After reading the speech I called upon a friend of mine who takes a great interest in the exportation of cattle; he suggested that a letter be cabled to Sir Chas. Tupper, giving him particulars; and I am proud to tell you that this gentleman not only sent a letter by cable which cost him $27, but he handed money to me to go to Ottawa, taking with me two members of the Dominion Live Stock Association, in order

that we might interview the Government. We met Mr. Abbott and Mr. Carling. Mr. Abbott thought that if they could give two or three hundred men steady work at Three Rivers they ought to do it. Just imagine the head of the Dominion about to risk the importation of a disease, which has cost Great Britain millions of pounds, in order that two or three hundred men might be given employment. However, we were promised that no action should be taken without most careful consideration, and I think the Dominion Government has now placed us in a position that we may keep our clean bill of health and go with a clean report to Great Britain with our cattle and sheep as we have done in the past.

This year I took one hundred lambs to England from the Experimental Farm at Guelph. They were fine, meaty, grade lambs, chiefly of the Shropshire breed, I believe, and just such a class as we want for export every year. On my arrival I found that the inspector had ordered an attendant to take one of the lambs for slaughter. I was too much annoyed to interfere, but watched the result. It turned out a remarkably good carcass of meat. I said to him, "Is there anything wrong with it?" "No," he said, "and you will not lose anything by having it slaughtered, for it will show buyers what sort of meat it is." We sold them at £2 8s. 6d. each. I have shipped thousands since then, and I have not obtained on an average 40s. 6d. each for them. Now, I wish that instead of us going year after year with cargoes of aged rams and baggy ewes, we could take just such sheep as I was judging yesterday—two year old and over, two year old and under. I could sell thousands of them. Do you know why I ask that this should be done if we are going into this business earnestly? It is because there is such a superabundance of common kinds of sheep going into England, that, unless we have a superior article, we cannot get the price that we ought to get. When I left England there were 900,000 carcasses of mutton in the freezing houses that had come from Australia and New Zealand, and at the same time they were arriving in great numbers week after week. We have only been in this export business sixteen years, and during that time all these other foreign places have developed their trade. We have improved and increased in our wealth in cattle, but we have made no progress whatever in sheep. If this Association is only meeting together to establish good breeds in order to do business with the United States, then there is no use my talking, but if this Association is for the purpose of giving us a class of mutton which will find purchasers in Great Britain, then let us have it; but we have not got it yet. We shipped thousands of sheep to England in May, June, and the latter part of July, and we lost money on every cargo, although we bought at four and three quarters and five cents per pound in the Toronto market. I did the best I could with them; I tried every port in Great Britain; but it was impossible to realise what we had paid for them in Canada and the expense we had incurred in shipping them across the Atlantic. I saw hundreds of Shropshire rams being shipped from England to America this year, and there is no doubt that a great many American dollars are going year after year to improve their breeds. What I would like to see for the future is that we should have a certain number of sheep, not too many, and that they should be of the best quality, so that we might establish a Canadian brand, both for our cattle and our sheep, as we have done for Canadian cheese.

This year, for the first time in sixteen years, I sold five head of cattle to one of Her Majesty's purveyors. I offered them to him for £25 each. He said, "I will have them, and that you may know the weight of them we will weigh them on the scale for your own satisfaction." We did so, and found they weighed 1,393 pounds each on an average; that was seven pounds the animal short of 1,400; and we got the home price for Canadian beef. I am satisfied that we should have this market with such protection as we have, and a clear bill of health as well. It all depends upon the farmer—not only the breeder of sheep but the breeder of cattle also—to give us the right article. Canada is capable of producing quite as good mutton and beef as can be produced in any other part of the world, and I think that, knowing this, it devolves upon every farmer of Ontario to make some effort toward this end. Give us the right article and there is no reason why the business should not be made a success. Give us sheep of the right character, and if you give us twenty or thirty thousand wether sheep, we can give you fair prices for them. We cannot sell these old rams and baggy ewes at any price whatever, and we have handled very little else up to the present time. (Applause).

NOTES OF AN ADDRESS ON SHEEP-RAISING.

An address from Mr. James Mills, President of the Agricultural College, Guelph, was the next item on the programme, of which the following is a synopsis:

In an address on sheep-raising delivered before the last Sheep Breeders' Association, President Mills, of the Guelph Agricultural College, stated that the total number of sheep in Ontario, young and old, was 1,344,180 in 1889, and only 1,339,695 in 1890, showing a decrease of 4,485 in one year, from which, he said, it appeared that we have at present only one sheep or lamb to every 8½ acres of cleared land in Ontario, to say nothing of the millions of acres of woodland pastures distributed over the province, and capable of supporting a large number of sheep under the most favorable conditions.

When he considered the facts of the case, he found it difficult to account for the smallness of the number of sheep now kept, and more difficult to give a satisfactory explanation of the decrease in the past year; for he thought that no other legitimate investment which a farmer could make, was at the present time likely to bring him so large and satisfactory a return as money wisely laid out on a flock of good sheep. Four things, he said, could fairly be claimed for sheep-raising in this province: (1) the capital required for sheep was less than for horses, or cattle, or even for pigs (when the cost of suitable pens was considered); (2) the labor with sheep was less and of a much cleaner and pleasanter kind than with hogs, or cattle, or even with horses; (3) the risk was less than with horses, and no greater than with cattle or pigs; (4) the profits, under present conditions, were greater than from any other kind of live stock.

A fair estimate of the number of lambs which one might expect to raise from good, healthy, fairly-managed sheep, was 1½ per ewe; and the price paid for lambs for many years past had not been less than $3. For the last few years, good lambs had sold readily for $3.50 to $4, and even $4.50 when taken from the ewes. If these same lambs were fed for a couple of months on rape and clover pasture, they would bring at least $6 each.

Supposing one had a moderate-sized farm, say 150 acres, of good sheep land—a considerable amount of it in pasture, and the requisite number of acres cultivated for the growing of clover-hay, roots, oats, peas, and rape; and he bought sheep as follows:

100 good, young grade ewes at, say	$800 00
3 " " thoroughbred rams for service	100 00
Total	$900 00

Then, according to a moderate estimate, he would have lambs to dispose of as follows:

150 lambs from 100 ewes—

At $3 00 each	$450, or 50	per cent. of the total outlay for stock.
" 3 50 "	525, " 58⅓	" " " " " " " " "
" 4 00 "	600, " 66⅔	" " " " " " " " "
or (being fed on rape),		
At $6 00 each	900, " 100	" " " " " " " " "

To say nothing of the wool, this would be a fair estimate of the returns (varying from 50 to 100 per cent.) in one year, from the investment of $900 as above; and from a judicious use of the same stock, without much or any additional expenditure, almost equally good results might reasonably be expected for the next four or five years. Of course, one wishing to continue at the business of lamb-raising would gradually renew his stock before any of it got too old for use.

From this showing, Mr. Mills thought he was justified in saying that it would pay our farmers to raise a larger number of sheep and give more attention to the breeding, housing, and feeding of their flocks. He did not know of any better way to clean land, keep it in good condition, and turn pasture, hay, roots, and coarse grain into money, with a minimum of dirty work and a large percentage of profit.

Locality and Other Conditions.

Notwithstanding the figures here submitted, President Mills thought it would not be wise for young men or old men to rush into sheep-raising without considering the locality and other conditions. It was, he said, undoubtedly true that sheep could be raised to

advantage in every part of Ontario, except a few acres of low-lying and very wet or marshy land; but it was equally true that our high or rolling land, with plenty of good pure water and a considerable amount of shade, was best adapted to sheep, especially the lighter breeds. Hence everyone should consider his locality, the breed best suited to it, and other conditions likely to affect his success.

Points which need more Attention.

Mr. Mills next spoke of some points which, he thought, needed more attention in order to insure general success among Canadian sheep-raisers:

(1) *The need of suitable sheds, with plenty of ventilation and abundance of yard room.* Sheep sheds should, as a rule, be long and narrow, say 20 feet wide, facing the south; constructed so as to afford complete protection against rain and storm; and having the doors and windows arranged in such a way as to admit plenty of fresh air at all times, without danger of draughts. So long as sheep were dry, they did not suffer from cold; but in frosty or even chilly weather, they could not be exposed to wet in their pens or elsewhere, without the risk of serious injury. All sheep, especially breeding ewes, should have plenty of exercise. Everyone knew this; but only very few made due provision for it, when planning their yards and buildings. The experience of the Agricultural College, at Guelph, had strongly emphasised the importance of this point.

(2) *A constant supply of pure, fresh water, accessible at all times.* Judging from appearances and the practice of many, one would think that sheep had but little need of water—that they could slake their thirst on snow in fall and winter, drink the dew in summer, and suck up the moisture of the air when closed in dry pens or sheds any time of the year. Such assumptions were the height of absurdity; and no man could be really successful in the management of sheep unless he gave them pure, fresh water every day, allowing them to take a little whenever they felt disposed.

(3) *Shade for the protection of sheep in hot weather.* Any one who had observed sheep knew that they suffered very much from the sun in the hot days of summer; and the successful shepherd would see to it that his sheep were shorn early in May, and provided with some kind of shade in their pasture during June, July and August.

(4) *More taste and skill among shepherds and farmers' sons in trimming their sheep.* A large number of young men in this province, and not a few of our professed shepherds, seemed to attach little or no importance to the trimming of their sheep. In this respect, many flocks were a disgrace to their owners, and to all who had anything to do with their care or management. They were utterly neglected till a few days before show time, when their attendants had a general clipping bee, which usually served till the time of the next annual fair. In this our young men and shepherds were far behind the sheepmen of Great Britain; and it was a pity that it should be so. There was something in the appearance of an animal—of a sheep, as well as a man or woman. A man with a frowsy head and shaggy, untrimmed beard, never passed for half his worth. So a neglected, rough-looking lot of sheep never brought any credit to their owner nor did much to increase his balance at the bank. Let our young men and shepherds wake up to the importance of this point, and keep their sheep nicely trimmed and neat-looking at all times, as the opinion which people had of our sheep, was formed not simply in the show ring, but by the appearance of our flock as seen from day to day.

(5) *Constant and persistent culling of flocks, always keeping the best for our own use.* Careful selection, said Mr. Mills, is undoubtedly one of the most important points in stock-raising of all kinds; and it is no less important to the sheep-raiser than to breeders of other animals. Constant culling should be the watchword of every sheep breeder.

(6) *Breeding with some definite idea in view,* so as to get improved Canadian types of all the breeds—types which would be admired everywhere, both for their beauty and their excellence. If our principal sheep-breeders were all working with definite, well-defined objects in view—with a firm determination to improve their respective breeds, it would contribute very much to the success of the sheep industry in this country.

(7) *Greater care to protect sheep from burrs in fence corners; hayseeds, etc., in badly-*

made racks; and chaff in straw stacks and poorly constructed sheep-shed lofts—all of which injure the quality and reduce the price of wool.

The PRESIDENT.—I feel it is my duty to make a few remarks on the practical address to which we have just listened. I understood Mr. Mills to state that we could never expect to rank with the sheep-breeders of the world if we sold our best animals to the breeders of the United States. I think Mr. Mills has a wrong impression if he thinks that these buyers secure our best. I am sure he will be pleased to know that in my opinion the buyers of this country are the most critical with whom we have to deal. It is true we sell large numbers of sheep to go to the United States, but it is also true that we sell large numbers of inferior sheep to go there as well. To the breeders of this country, however, we sell but few that are inferior sheep. In my own experience I have received better prices from gentlemen in this country than from buyers from across the line I have been recently offered the largest price for a Canadian bred sheep that has perhaps ever been paid either by a citizen of the United States or by a Canadian. I had the courage to refuse $600 in gold for one sheep which I have here now in these exhibition grounds. I think that Canadian buyers and Canadian breeders ought to have a little credit for keeping some good sheep in this country.

Ald. J. HALLAM, Toronto.—Probably every gentleman in this room is a breeder of sheep, and all are aware that most of the remarks made by President Mills are to the point. But while we are convinced of this, the question is, how is this information to be brought within the reach of the farmer? I buy wool from a great number of them, and my experience is that the great majority handle the product in a very slovenly and careless manner. They market their wool in bad condition, full of burrs, seeds and chaff. Even first-class breeders often bring in their wool in this condition. The last clip has been remarkable for this kind of thing. Now, what I would like, is for President Mills, or this Association, or the *Farmers' Advocate*, to disseminate information among our farmers, pointing out the necessity for greater care in this respect. Instruct farmers to bring the wool to market in better condition, free from all foreign matter; the sheep will not only be healthier for it, but the farmers will get better prices for the wool. I regret to say that wool has gone down about a cent or a cent and a half per pound since the last clip was marketed. Money in the United States is exceedingly tight in manufacturing centres, and the large quantity of wool imported and left in bond in Boston, New York and Philadelphia, is now telling upon the Canadian clip. I think another twelve months must elapse before a rally in the wool market can take place. I want to impress upon sheep breeders, and upon the great mass of our farmers who have thirty or forty sheep for breeding purposes, that through inter-breeding they are making the wool so brashy that it is fit for nothing but blankets, etoffes, and the coarser classes of goods Everyone who understands this question will bear testimony to what I say as being correct.

With regard to lambs; about ninety per cent of the animals killed are lambs. This means a great loss to the farmers in killing and selling off at this time of the year. This, however, is a question with which I have but little to do. Being connected with the wool business, I want to see the standard of wool raised higher than at present. There is an unlimited demand for Southdown wool, if it can be got in sufficient quantities, free from back-scratchers. It is my experience that after one or two clips the wool becomes very tender and gets full of seeds and chaff which make it objectionable. This is not so much the case with imported wool as it is tolerably free from back scratchers, which are so prevalent in Canadian wools. I hope that the great mass of the farmers will be able to avail themselves of the valuable information contained in Mr. Mills' address.

Mr. MILLS.—What do you say as to the value of wool from lambs shorn in the fall?

Ald. HALLAM.—We do not get any in this country. The value of that wool depends of course, on what sort it is. I think that Shropshire wool shorn from lambs in the fall would be the most valuable. In England, shorn lambs' wool fetches the highest price. We imported a large quantity of Danish lambs' wool. It was very fine wool, and entirely free from foreign matter There is also the Kent lamb, which is similar to the Danish. These wools are used for knitting purposes and are shorn in September or October, and they fetch from eight to ten and twelve pence per pound, in the unwashed state, according to quality, and average from two to three pounds per fleece.

Mr. MILLS.—A gentleman named Lewis has just published in Philadelphia a book on sheep, which is supposed to be an authority. He says, and repeats it three times, naming Southdowns, Oxford-downs, Hampshires and Shropshires, that the fineness of the wool is in that order; and he distinctly states that there is not much difference in the first two, but that the Shropshire wool is the coarsest. This is entirely contrary to my observation.

Ald. HALLAM.—The wool of Shropshire lambs, clipped in the fall, is the highest priced wool, as it is very desirable, being largely used in the knitting districts of England for hosiery and underwear.

BREEDING WITH A DEFINITE OBJECT IN VIEW.

The discussion of Mr. Mills' address being concluded, the President called upon Hon. Mr. Dryden, Minister of Agriculture, to address the meeting. Mr. DRYDEN said:

MR. CHAIRMAN AND GENTLEMEN: I did not come this evening prepared with a very long speech, and if I had, I certainly would not inflict one on you to night. I must congratulate you, however, on the splendid meeting you have here. I do not know to whom the credit is due, but someone must have worked hard to secure so large an attendance with so much to attract attention outside in connection with this exhibition. I have noticed that your secretary is working incessantly, and perhaps the credit is due to him.

The more I travel over our province, the more decidedly I am of the opinion that a large proportion of our territory is eminently adapted to the growth of sheep, and I do not think that the figures given by President Mills reach at all to the number that we ought to have. I think his figures show conclusively that there is nothing more profitable to this province than sheep-raising. When one considers that a few sheep may be raised on a farm at very little expense, it does seem a wonder that our farmers do not go more generally into the business.

Alderman Frankland told you something about the success of the shipment of lambs experimentally fed at the Ontario Agricultural College and Experimental Farm this year. I may say that these lambs were a mongrel lot; they were an average lot, such as might be obtained in any part of the country. They were sent to England, and (I speak from memory) they netted between nine and a half and ten dollars each, when all expenses were paid. They were of very good quality because in this country we have a good climate for producing quality. I always feel proud when in visiting New York city I see in large letters on the butchers' carts, "Canadian Mutton." Would it be placed there so conspicuously if Canadian mutton was not of a better quality than American mutton and had achieved this reputation in that city? All this indicates to my mind that we have a good country to grow mutton.

There is one thing about which we ought, it seems to me, to be particularly careful. We have in this country, I believe, almost every known breed of sheep, and what we need is for farmers in each locality to single out the breed those best suited to their section. I believe that a particular breed may be better adapted to one locality than to another. I notice that in England the farmers seem to have settled down to one particular breed of sheep in each district. In each district they treat them somewhat differently, and the results reached are different also. It seem to me that if we could in this country decide for ourselves what is best, and work on this plan, it would be a good thing. What pains me more than anything else as I go about is to find our farmers generally adopting an exactly opposite course. They are crossing and re-crossing until one does not know what they have got nor do they know themselves. Have you not seen, as I have, a man start with a lot of Leicesters, we will say. He is perhaps induced to buy a Shropshire ram to cross with them; but he does not seem to have any definite intention of breeding Shropshires. Presently he will try a Cotswold. Then he thinks he is getting them too coarse and secures a Southdown. He finds that the wool is getting a little short, perhaps, and he buys a Lincoln to even it up again. In a little while he

will go to the show and see a Merino and try one of them; and by this time he will have neither fish, flesh, fowl, nor good red herring. (Laughter.) He has neither uniformity of wool nor of mutton, but every conceivable grade of both; yet men go on in this line continually. If there is one thing more than another that I would like to impress, it is this idea: let our farmers get some notion of the particular breed of sheep best suited to their respective locality and stick to that breed, whether it be Leicesters, Lincolns, Southdowns, Shropshires, or any other. You will then get a distinct type, and if buyers of wool or mutton want that type, they know where it is to be found.

I hope that we as breeders of sheep shall not only be careful as regards the different breeds of sheep we represent, but that we shall constantly bear in mind that we are breeding (no matter what breed) to the end that we may increase the general excellence and raise higher the standard of our average product. It is practical results we ought to aim at. These sheep are produced for wool, mutton, or both, and we must seek to obtain the very best of these products possible. There is no better meat food for our people; there is nothing more wholesome than roast lamb or mutton, and no domestic animals are more easily raised than sheep. When I go to the hotels of this city and ask for a piece of lamb, I often do not get lamb at all; I get three year old ewe, (laughter,) which never achieved sufficient size to be sold as a sheep and was therefore sold as a lamb. I know it is not lamb because one can scarcely cut it with a knife. (Laughter.) I mean to say that for our own sakes we should insist that a better quality of mutton than this be placed upon the market. People are demanding it, and there are plenty willing to pay the highest price for the quality they require. After all, it is only the best quality that pays in any article you produce; and the man who places the best quality on the market is always likely to succeed the best.

Allow me in conclusion to congratulate the Association on the success of this conference. (Applause.)

PRACTICAL HINTS ON A FEW COMMON DISEASES OF SHEEP.

By A. W. Jackson, V. S., Mercer, Penn.

I have chosen "Practical Hints" as the subject of this paper, for the reason that many of those whose profession calls them to minister to the ailments of animals consider the diseases of sheep of so little importance that they neglect to acquaint themselves with even their more common ills.

The professional man expands his energy principally in the direction in which his bread and butter lies, and the reason why so many veterinarians devote so little attention to *morbus-ovis* is that "There's no money in it."

As it is only in the treatment of the well-bred animal that we are warranted in expending much time and outlay, it is especially to the breeders of such that any suggestions will be applicable. An additional reason why my hints will be directed more particularly to the fancy breeder, is that his carefully husbanded favorites are especially liable to the diseases I have chosen for consideration at this time.

While I have learned to appreciate this fact that the different breeds of sheep are peculiarly liable to certain diseases, it is not my intention to particularise in any way, either by showing which are or which are not likely to be the subjects of any given morbid process.

We frequently hear such disparaging expressions concerning the treatment of sheep that it is not surprising that many breeders have come to think that sickness and death are so nearly approaching the synonomous that in fulfilment of the words "Fell me, I'm sick; I'm dead," they look upon an ailing sheep as a certain addition to the compost heap.

That it is more difficult to locate disease in sheep than in most other animals, I am ready to concede, but that an intelligent man—one who has familiarised himself with the characteristic manner in which these animals make manifest their trouble—should have any difficulty in recognising the common diseases of sheep, I am not willing to admit. Just as the different natural physiological processes in the human being are

interfered with by a high grade of civilisation, so does the perfecting of breeds, with its artificial form of husbandry, predispose its subjects to disease.

To make it possible for us to diagnose disease it is necessary that we have an intelligent understanding not only of the habits of our patients, but also of the morbid process and the physical characters of the parts implicated, both in health and disease. Not only at its commencement, but all through the progress of a disease we must be able to ascertain the heart's condition and the accompanying degree of temperature. In order to recognise abnormalties in either of these with any degree of intelligence it is essential that we acquaint ourselves with their variations in health. The action of the heart depends in so large a measure on the absence or presence of disease, that by making a careful study of it in health we are able to recognise its condition in disease.

But the variations in the temperature of sheep occur so independently of disease that it behooves us to understand what conditions in health are accountable for them. The question then arises how can we account for the variations of temperature in health? for we know that by taking the temperature of a number of sheep on different days, that our examination reveals not only a marked difference in the registration of the various days but also a notable variation in the effect produced on the same day.

The uniformity of temperature in most animals is maintained in a large measure by the action of the skin in the process of perspiration. But as with the dog, in wool-growing animals this function takes so large a part in the equalisation, that other parts are called upon to do the work. And hence while we experience the greatest amount of discomfort on a warm day with an atmosphere charged with moisture, these animals pant and protrude their tongues on a warm day with a dry atmosphere.

It has occurred to me that no class of diseases is possessed of so much importance to the breeder of pure bred sheep in this country as that embracing the affections of the contents of the chest. It is for this reason that I have selected a few of the more important of these for our consideration. In order to place ourselves in a position to correctly appreciate the condition of things when organs within the chest walls are involved, we must not only be able to count the heart beats and register the temperature, but also to learn by practising auscultation what deviation from the normal sounds the disease process is producing, and by percussion what alteration in the density of bodies has taken place. One of the most common diseases affecting the lungs of sheep is bronchitis. Occurring as it does during every season of the year, it is often a source of much annoyance to the flock owner. It is a catarrhal inflammation of the larger bronchial tubes, and is due in the majority of cases to exposure to cold. While it is usually accompanied by a slight amount of fever, it is recognised in the main by the presence of a harsh, dry cough, occurring in paroxysms. The ear placed to the chest in the early stages reveals hard respiration over both lungs, and dry, sonorous rales heard throughout the chest, which, as the cough loosens, are replaced by bubbling sounds. It is seldom that much in the way of treatment is called for, but in the early stages a light mustard application with small doses of Dover's powder will often prevent the acute attack from becoming chronic. In the second stage stimulating expectorants, as ammonium chloride or carbonate combined with a little tincture of opium and squill, are useful. When this inflammatory process extends from the larger to the smaller bronchial tubes, it constitutes capillary bronchitis. This is seen principally in old debilitated subjects and in badly nourished lambs, and is always a dangerous affection. As the inflammation extends downwards there is a gradual rise of temperature, increased depression and symptoms indicating the want of aeration of the blood, as great difficulty in baeathing, feeble circulation, blueness of the visible mucus membranes, etc. As the disease progresses the patient grows weaker and weaker, the cough becomes suppressed and the extremities cold, all of which indicate the near approach of death. The difficulty in recognising this disease is to differentiate it from broncho-pneumonia. While in the latter disease percussion elicits persistent dulness, in this affection the note is clear except in shifting spots.

If the case is seen early the thorough use of counter irritation with $\frac{1}{3}$ drop doses of the fluid extract of veratrum viride every three hours is indicated.

When there is great difficulty in breathing $\frac{1}{2}$ grain doses of ipecacuanha frequently repeated are of undoubted utility.

In addition, the ammonium salts should be administered, systematic feeding kept up and stimulants judiciously used. In the treatment of chronic bronchitis inhalation of tar and iodine with the internal use of sulphur and arsenic may be tried. Asthma is occasionally seen in lambs, and is recognised by the presence of low wheezing expiratory rales and the absence of any of the signs of an inflammatory process. The paroxysms can be quickly relieved by inhalations of chloroform or amyl nitrate 2-5 drops, but potassium iodide and arsenic should be employed to prevent the recurrence of the attacks.

The cases in which we most frequently see hyperæmia or congestion of the lungs are animals in high condition, which are forced to exert themselves unusually. In these cases it sometimes proves fatal very quickly to the great surprise of the flock master.

In a mild case nothing more than slight shortness of breath, perhaps an occasional cough, quickened circulation and restlessness will indicate the existence of anything abnormal. But in the severer cases the difficulty of breathing, which is so great as to nearly approach suffocation, is accompanied by great depression, followed in many cases by death in a few hours.

While in the milder cases the ear will detect a few fine bubbling rales, in the severer one they are replaced almost entirely by bronchial breathing. In mild cases nothing more than a little counter-irritation with slight stimulation is called for, but when the dyspnoea is so great as to endanger life venesection should be resorted to and aconite administered to regulate the action of the heart.

Of all diseases that affect the lungs of sheep none cause so much loss to Canadian breeders as pneumonia. Pneumonia in sheep is usually of the croupous or lobar variety, and is an acute inflammation of the lung tissue attended with exudation into the air vesicles. It is due in most cases to direct exposure to cold and damp, and is principally met with in the fall or spring months. The engorgement of the first stage is followed by consolidation of the disease, either ends in resolution or gray hepatization. If resolution takes place the exudate undergoes fatty degeneration and is either absorbed or expectorated. When it terminates in gray hepatization the exudate and air cells soften and undergo caseous degeneration, break down and form a purulent infiltration.

In the majority of cases the posterior lobe of the right lung is the seat of this disease, and while all the tissue of that side may be involved, double labor pneumonia is rare. Though it is usually ushered in by a chill it is seldom observed. The principal symptoms are elevated temperature, 105° to 107°, opression in breathing, hurried respiration, slight cough and marked disproportion between the pulse and that of respiration. If gray hepatization occurs there is great prostration. The respiration becomes faster, shallower and more labored, there is flapping of the nostrils and signs of impeded circulation.

This disease usually runs its course in from 7 to 10 days, but many cases terminate very quickly. In the first stage the percussion resonance is somewhat impaired, and on inspection the respiratory movement on the affected side is impaired. On auscultation there is feeble inspiration, prolonged expiration, crepitant rales (pathognomonic of pneumonia) heard only in inspiration. During the second stage there is marked dulness on percussion and marked deficiency of respiratory movement on the affected side, the movements of the sound lung being increased. If resolution takes place the signs of consolidation disappear, but if softening of the lungs is taking place they remain as in the second stage. The appetite is interfered with to such an extent that it is usually necessary to support the strength of our patient by giving light gruels, teas, etc. In the early stage 1 to 5 drop doses of the fluid extract of veratrum viride, or of aconite may be given every few hours, watching its effect and discontinuing when consolidation occurs. When consolidation is present 2 to 4 grains of quinine should be given every four hours, and to strengthen the heart and equalise the circulation digitalis may be combined with it if indicated. Either the ammonium or potassium salts may be alternated with the above and in all cases mustard plasters, turpentine stupes or even blisters should be employed. Stimulants should only be employed when the patient is weak or the heart

sounds are feeble, and for this purpose may be given in combination with the tincture of the chloride of iron. In the early stage the following makes a good combination :

Tinct. Veratri Viridis	11 Minims
Spts. Ætheris Nitrosi	6 Drachms
Liq. Potassii Citratis	4¼ Drachms
Syr. Zingiberis ad	6 Ounces

Dose : A tablespoonful every 3 hours in water.

For a stimulant in the later stages the following is useful :

Ammonii Muriatis	10 Grains
Spts. Chloroformi	30 Minims
Aquæ Comphoræ	5 Drachms

Dose : To be given every three or four hours.

Broncho or lobular pneumonia is a catarrhal inflammation of vesicular structure of the lungs, resulting in patches of consolidation diffused over both sides, affecting principally young animals and usually commencing in an attack of acute bronchitis. It is recognised by the age at which it occurs, by following an attack of bronchitis and by symmetrically affecting both lungs. But as it is difficult to differentiate between it and croupous pneumonia in sheep, its true nature is often only learned by the autopsy. The treatment is essentially the same. Tuberculosis is occasionally seen in sheep on farms where diseased cattle are kept, but space will not permit of its description here. It has been my experience to meet with pleurisy more frequently than any other affection of the chest, and considering its amenability to treatment I consider it the most important disease of our list. It is a plastic inflammation of the pleura characterised by sharp pains in the side, dry cough, fever and difficulty in breathing, and generally follows exposure to cold and damp. It is seen principally during the spring months when north and east winds prevail, and lambs at this season are especially liable to suffer from these causes.

The inflammation may be localised or diffused, but is usually limited to one side. The inflammatory process is followed by an exudation either of lymph or serum, either of which may become gradually absorbed—with or without the adhesions—or the fluid may remain as a chronic condition or may become purulent.

While the symptoms are often obscure—occasionally utterly absent—in other cases they are so well marked that once seen they should never be forgotten. There is usually sharp pain, increased by coughing, breathing and by movement, which disappears when fluid is poured out. There is a certain amount of fever with a frequent and compressible pulse. While in many cases the appetite is not much interfered with, in the worst cases complete anorexia is present. The animal presents a characteristic appearance and moves in a stiff hesitating way. The breathing is principally abdominal, and by pressing or tapping the sides of the chest often causes a painful moan.

During the dry stage a physical examination discovers but little abnormal beyond a lack of expansion during inspiration, and a friction sound heard both on expiration and inspiration. In the stage of effusion there is dulness on the lower part of the chest on percussion and marked enfeeblement of the vesicular murmur.

This dulness decreases as the effusion is being absorbed, and the respiratory sounds gradually grow stronger. The early application of mustard, followed by warm linseed poultices have a good effect, both in relieving the pain and controlling the inflammation.

If the animal is in good condition and the pulse full and bounding 1-2 drop doses of the tincture of aconite should be given every half hour in spirit of mindererus. This must be stopped as soon as effusion takes place, and with the restriction of liquids, active purgation should be resorted to and diuretics, as digitalis or the acetate of potash used.

I have found the following a good combination in acute pleurisy before effusion:

Tinct, Opii	6 Drachms
Tinct. Aconiti Radicis	2 Drachms

Dose : Eight drops in water every hour.

For its diuretic effect after effusion has taken place the following is useful:

Potassii Acetatis.....6 Drachms
Spts. Ætheris Nitrosi.....1 Ounce
Aquam ad.....8 Ounces

Dose: A tablespoonful every three hours in water.

Chronic pleurisy is not of frequent occurrence in sheep, and since its successful treatment depends largely on operative measures, I will not take it up here.

PRACTICAL SHEEP BREEDING.

By D. G. Hanmer, Mount Vernon, Ont.

The value of sheep to the farm is perhaps not fully understood by many farmers. It is an old proverb that whenever the foot of the sheep touches the land it is turned into gold. Sheep husbandry has a value to make the land more profitable, more productive at a less expenditure than any other animal kept on the farm.

The question of raising sheep for their meat is not an unimportant one, as the population of the country increases, the consumption of eatables increases, and the favorite meat and that which brings the highest price is lamb, which can now be purchased only as a luxury by those who can afford it.

Sheep farming in Canada does not require large capital invested and the risk is small, for sheep, if well managed will not die in debt to their owner. Many farmers manage to have a lot of old run down sheep in their flocks, which is bad economy to say the least and should be remedied or entirely avoided.

And now is the time to attend to this matter by looking over the flock and selecting out all such as are not doing well, and putting them on as good pasture as can be afforded, and with the addition of a little grain they can be made ready for the butcher by the time winter sets in; so long as a sheep is healthy it can be fatted, but it is not good policy to keep them until they become too old, as it has a tendency to run down the flock and give it a rakish appearance. Every farmer should look carefully over his flock every fall and select out all that cannot be kept longer with profit. It is frequently the case that lambs are let run with their dams too long which has an injurious effect upon both, so long as they run together the lamb will depend on the milk drawn from its mother for sustenance which often does not amount to much. Consequently both are the worse for not being separated; about four months is the proper age to wean lambs.

Should cold rains prevail during the early fall months, lambs should be put under shelter, and as the season advances they should be kept in at nights and gradually taught to eat; by so doing the change from pasture to dry feed will scarcely be perceptible. As lambs are one of the largest sources of profit to the sheep farmer he should observe every requisite to success in rearing them.

It will not require an observing person to keep sheep many years until he will find out that the main thing in wintering them is to keep them up in the fall, for if permitted to lose flesh then they will scarcely recruit up again during the entire winter.

A practice now prevailing with many farmers, and one which in our opinion cannot be too strongly condemned, is that of allowing grade ram lambs of all descriptions to run without castration, not only depreciating their value for the butcher but is also the cause of many inferior rams going into service.

When by the expenditure of a few dollars extra pure bred rams of the various breeds could be secured, we have no hesitation in saying there is little or no excuse for the farmer who will at the present time place an inferior or mongrel bred ram at the head of his flock.

Care and judgment should be exercised in the selection of a ram, as much of the future value of the flock will depend on the impression he leaves on his offspring. A man may save himself a lot of trouble and disappointment by making the head a first principle in establishing a flock. The head of an animal is the main index to his purity of blood, strength of constitution and actual fitness for the service for which he is

intended. If you go for breed you look above all to the head, if your aim be style or fashion you must seek this in the head, as nine times in ten that very accommodating phrase known as quality should prove itself by a good head ; it is the head that carries impression and sets off the whole proportion. It will overcome many other defects, and will go a long way with judges in determining their awards in the show ring.

The man who would succeed as a breeder of sheep must be always aiming higher by a constant endeavor to bring his flock to a more thorough state of perfection.

Hon. Mr. DRYDEN.—Perhaps it is not fully understood that the report of these proceedings will be printed. All the gentlemen connected with this Association will, I presume, receive a copy. The Department over which I preside has lately adopted the plan of sending many reports such as this to the members of the farmers' institutes throughout the province, and possibly this report may be dealt with in the same way.

The PRESIDENT.—I expected Hon. Mr. Dryden would have said something to you about an interview we had recently with the representatives of the different railway companies when they met to discuss the question of freight rates, etc. I learned by communicating with Montreal that there would soon be a meeting of the tariff committee in Toronto, and as soon as the date was made known to me, I requested Mr. Dryden to accompany me. We stated our case plainly and clearly to the committee. We stated that we wanted our sheep shipped in the same manner as other merchandise ; that we were willing to pay first-class rates, but not double first class rates. We said we thought that when we had but a small number of sheep to ship they should be shipped without crating. A buyer will often purchase five, ten, or fifteen sheep, and we have either got to crate them or ship and take the chances paying for a car-load.

I am afraid, however, that the efforts we made will prove fruitless, and I shall be glad if the members of this Association will stand together in this matter and discuss it, or think it over and discuss it at our next meeting, in order that we may get what we think we are entitled to from the railway companies. I believe we have a good case and that we have a right to ask what we are asking. We are not getting the recognition which we should receive from the railways of this country, and I trust that this Association will see its way to take united action in the matter. In England it is entirely different. There, if a man has freight to ship, the agents of the different companies are looking for him to get his patronage ; and in the United States they are doing this kind of thing a good deal more than it is done here. Our companies seem to think that these small shipments yield no returns, but we affirm that small quantities lead to large quantities.

On the motion of Mr. Jackson, seconded by Mr. Hector, the meeting adjourned.

ANNUAL MEETING.

The Annual Meeting of the Dominion Sheep-Breeders' Association was held on February 4th, 1892, at Shaftesbury Hall, in the city of Toronto, Vice-President James Russell, of Richmond Hill, occupied the chair. There was a large muster of members.

Mr. RUSSELL.—It gives me great pleasure to see so many pominent sheep-breeders present at our annual meeting. I extend you a hearty welcome, and trust that you will co-operate to make this gathering one of the most successful conventions we have ever held. I am sure that the success which has hitherto attended our Association must be a matter of satisfaction to all concerned. It is an Association which was very much needed, and I am glad to see that the breeders are taking advantage of it. Everything that may be done in their interest means money in their pockets. Your presence here to-day shows that you take a lively interest in your business and are determined to make it a success. It is only by combining that we can receive those advantages which are due to us, and also become helpful to others who are only beginners in the business of sheep-breeding. By our efforts here, we are advancing the interests of sheep-husbandry throughout our province and this Dominion. I am sure you will all agree with me when I say that we have a good man at the head of affairs in the person of the present Provincial Minister of Agriculture, and it must be maintained that it is of great advantage to stock-raisers generally to have such an able man in that important position.

The VICE-PRESIDENT.—Our Secretary suggests that a committee be nominated to interview the officers of the C. P. R. and the G. T. R. in order to obtain better shipping facilities for stock. I have pleasure in proposing the names of Messrs. McCrae, Snell and McGillivray as a committee to draft a resolution to be laid before the officials of both railways representing the views of this Association as to the necessity for improved shipping facilities. Carried.

THE SECRETARY'S REPORT.

I am glad to be able to report that the influence of our Association is gradually increasing; during the past year the correspondence has been much larger than in any previous time. Our last report was frequently asked for by persons residing in all parts of the Dominion. I have carefully watched the working of kindred associations which receive government grants, and I believe we are giving the country better returns for the money we have at our disposal than any of the other societies, except the Swine Breeders' Association, which is doing about the same work. That the sheep-breeders appreciate our work, is proven by our increase of membership. In 1889 but 28 names were on our roll as paid members, but in 1891 our membership numbered 94. For 1892 the outlook is better than ever before; leading men who have never taken an interest in our Association are now becoming members.

On Monday last I was favored by an audience with the Hon. John Dryden, Minister of Agriculture for Ontario, when he kindly consented to print and distribute our annual report. This will allow us to use our grant to forward the sheep interests in other directions. I would advise that a deputation be appointed to wait upon the Hon. John Dryden and pray that a copy of our report be sent to each member of the farmers' institutes in Ontario. This would be of great benefit to the farmers and be the means of largely increasing our membership and our field of usefulness.

Since 1889 we have held two meeting each year, one in the spring and one in September. I would suggest that hereafter we hold but one, and that it be an all-day session, or if necessary longer, so that we may be enabled to get up a good annual report. Further, that hereafter the time of holding such meeting be in December, and that we join with the Ontario A. & A. Association, or Guelph Fat Stock Club, or some other kindred association or associations, in order to assist in holding a good fat stock show. Of course our efforts will be entirely given to the sheep department.

Without any increase in our grant for 1892, with our present surplus, we could offer $400 in premiums in December. From such an exhibition, if properly conducted, much valuable information could be gleaned. Each exhibitor in our department should be required to furnish such written statements regarding his exhibit as our Executive may require, and the valuable matter thus obtained would be very suitable for publication in our annual report. By this means we may lay or assist in laying the foundation of what will in future be Canada's great winter exhibition, the veritable Smithfield of America, of which the Canadian breeders and farmers will have full control.

Another matter to which I would like to direct your attention is the appointment of gentlemen to address the farmers' institutes. The Ontario Department of Agriculture, in connection with President Mills and the Executive of the Central Farmers' Institute, appoints certain men each year to address institute meetings in various sections of the province. Other associations have had the privilege of nominating men, and I think that it would be wise for this body to select say three gentlemen, and respectfully request that they be placed on the staff of lecturers and that their duty as lecturers be confined to addresses on sheep husbandry.

Mr. McCrae.—I think that according to our membership and the extent of our work so far, we are getting a very fair share of the grants. The Association is certainly to be complimented on the existing handsome surplus.

Distribution of the Report of the Association.

The Secretary.—I may say that at a recent interview I had with the Minister of Agriculture, that gentlemen very kindly consented to print our report for us. The report can be distributed from the Department free, and the question arises as to what use shall be made of the report. The Minister suggested that possibly it might be sent to members of farmers' institutes throughout the province, which means that it would have a circulation of between fifteen and twenty thousand copies. I would suggest that a committee be nominated to confer with the Minister on this subject.

It was accordingly resolved on the motion of Mr. McCrae, seconded by Mr. Snell, that Messrs. Jackson and Kelly be nominated a committee to consider the matter and wait upon the Minister of Agriculture.

Changing the Date of Meeting.

Mr. Simmons.—I think that the Secretary's suggestion to have but one meeting a year instead of two and to hold it at the time of the Fat Stock Show is a very good one. No doubt many of our members would be in attendance at the show and we would thus secure a better attendance and could afford to hold an all-day meeting, which would enable us to get up a report of considerable value. So far as offering prizes for fat-stock is concerned, if our treasury is able to meet the demand, it would doubtless be a very good move.

On the motion of Mr. Snell, seconded by Mr. Simmons, it was therefore resolved, That the Association have but one meeting a year, said meeting to be held at the time of the Fat Stock Show in December, wherever that show may be held.

Delegates to Farmers' Institutes.

Mr. E. Jeffs (Bond Head).—While I approve of the desirability of having the sheep interest represented on the delegations to our farmer's institutes, I do not think that our representative should be compelled at all times to speak on sheep-husbandry.

Mr. McCrae.—It is a difficult thing to be obliged always to speak on one subject and should not be made compulsory. From my own experience I have found that an audience will sometimes take the speakers in hand and then there is nothing for it but to submit. On one occasion, for instance, I was prepared to speak on the subject of wool-growing, but when I got to the meeting they would not listen to that at all and insisted that I should speak on the subject for which the gentleman whose place I was taking was advertised. At the same time sheep-husbandry should be considered the proper subject for our delegates to take, and this must be the understanding when the list of speakers is being drafted.

Mr. James Tolton (Walkerton).—The usual course is I believe to have each delegation consist of a Professor from the Agricultural College, a practical farmer, and a representative of the Fruit-Growers' Association, who of course takes fruit-growing as his special topic. I do not see that there need be any difficulty about our representatives speaking upon sheep-husbandry. It is necessary that the farmers should be impressed with the advantages of raising more sheep, and this is one of the very few ways by which it might be accomplished.

Mr. McCrae.—Any man who can talk sheep really well would doubtless be sufficiently well-informed to speak upon something else if occasion required.

Mr. Tolton.—I do not see how three or four men are to cover the whole province.

Mr. McCrae.—I do not think that it is the intention to send the delegates into all parts of the province during the one season.

Mr. Jeffs.—I have taken part in institute work for the past four years and have always endeavored to see that our interests were looked after in my section; and from the newspaper reports I noticed that the other delegations apparently did the same thing. I do not think therefore that our interests have been altogether neglected in the past.

The following gentlemen were nominated as delegates from whom a selection might be made for institute work: Robert Miller, Brougham; E. Jeffs, Bond Head; R. R. Sangster, Lancaster; J. L. Wilson, Alexander; W. C. Edwards, M.P., Rockland, J. C. Snell, Edmonton; John Jackson, Abingdon; James Tolton, Walkerton; D. McCrae, Guelph.

The Secretary's report as a whole was then adopted on the motion of Mr. McCrae, seconded by Mr. Jackson.

TREASURER'S REPORT.

Financial Statement of the Dominion Sheep-Breeders' Association for the year ending February 5th, 1892.

Receipts.	$ c.	Disbursements.	$ c.
Balance from previous year	253 30	Convention and meeting	60 70
Members fees	94 00	Officers' salaries	50 00
Legislative grant	300 00	Postage and stationery	34 68
Advertisements in report (net)	30 00	Printing	152 90
		Lecturers' expenses	40 00
		Reporter	10 00
		Association stamps	4 70
		Balance on hand	324 32
	$677 30		$677 30

Examined and found correct.

William Linton, Francis Greene, Jr. } Auditors.

February, 5th, 1892.

The report was adopted on the motion of Mr. McCrae, seconded by Mr. Simmons.

THE ELECTION OF OFFICERS.

The following gentlemen were elected officers of the Association for the ensuing year:

President, James Russell, Richmond Hill; Vice-President, John Jackson, Abingdon; Secretary, F. W. Hodson; Treasurer, F. R. Shore, London.

Directors.—*Shropshires*, R. Gibson, Delaware; *Leicesters*, John Kelly, Shakespeare; *Cotswolds*, J. C. Snell, Edmonton; *Merinos*, W. Smith, Fairfield Plains; *Horned Dorsets*, T. W. Hector, Springfield-on-Credit; *Oxfords*, James Tolton, Walkerton; *Hampshires*, John Kelly, Shakespeare; *Lincolns*, W. Oliver, Avonbank; *General*, John I. Hobson, Mosboro'.

Auditors.—John S. Pearce, London; R. Gibson, Delaware.

Messrs. McGillivray and Jackson were re-nominated as delegates to the Committee of the Agriculture and Arts Association in connection with the World's Columbian Exposition.

Delegates to Fair Boards.—The following gentlemen were appointed as delegates to the respective Fair Boards for the ensuing year. The especial duty devolving on them is to urge that the fair boards select judges from among those named as experts: Toronto Industrial Exhibition, J. Russell, and J. C. Snell; Ottawa Exhibition, R. R. Sangster, J. L. Wilson; Hamilton Fair, J. Jackson and J. Kelly; London Fair, H. Beattie, and F. R Shore; Kingston Fair, C. W. Neville.

Expert Judges.—The following gentlemen were recommended to the Fair Boards as competent judges in the respective breeds:

Horned Dorsets.—W. S. Hawkshaw, Glanworth; J. T. Smith, Mt. Vernon; J. Jackson, Abingdon; J. Tazewell, Port Credit.

Southdowns.—A. Simenton, Blackheath; G. Baker, Simcoe; E. Cresswell, Egmondville; S. Lemon, Kettleby; T. Wilkinson, Hamilton; J. Davidson, Monroe, Mich.

Cotswolds.—John Thompson, Uxbridge; J. C. Snell, Edmonton; J. Ward, Marsh Hill; W. Thompson, Uxbridge; T. Colley, Castlederg; Wm. Laidlaw, Wilton Grove; H. Rawlings, Forest; T. Waters, Rockwood; A. Johnston, Greenwood; H. Crawford, Canboro'; T. Teasdale, Concord; Wm. Petch, Blackheath.

Shropshires.—R. Gibson, Delaware; F. R. Shore, London; T. M. Whiteside, Innerkip; D. G. Hanmer, Mt. Vernon; W. H. Beattie, Wilton Grove; J. Campbell, Jr., Woodville; W. S. Hawkshaw, Glanworth; J. Conworth, Paris; Alf. Brown, Bethel; W. D. Reesor, Markham; R. Miller, Brougham; J. McFarlane, Clinton; J. Cochrane, Hillhurst, Que.; D. Brims, Athelstan.

Oxford-Downs.—H. Arkell, Teeswater; F. R. Shore, London; J. Rowand, M.P., Dunblane; J. Russell, Richmond Hill; J. E. Story, O.A.C., Guelph; W. Dickison, Mildmay; J. Tolton, Walkerton; P. Arkell, Teeswater; J. Harcourt, St. Ann's; Henry Arkell, Arkell; R. Miller, Brougham; Smith Evans, Gourock.

Leicesters and Lincolns.—G. Weeks, Glanworth; B. Snary, Dawn Mills; W. Cowan, Galt; Mr. Allan, Bowmanville; John Miller, Brougham; Wm. McKay, Elmbank; J. J. Pearson, Whitby; J. Snell, Edmonton; J. C. Snell, Edmonton; W. E. Swain, Valentia; Robt. Miller, Brougham; Andrew Telfer, Paris; J. Mason, Princeton; T. Russell, Charing Cross; J. Burns, King; J. Cowison, Queensville; John Scott, Ivan.

Merinos.—J. B. Moore, Galt; A. Tirril, Wooler; Rock Bailey, Union.

On the motion of Mr. Crawford, seconded by Mr. Jackson, it was resolved that, in the opinion of this Association, it is desirable that the Fair Boards should adopt the one-judge system for sheep, and that the Secretary be instructed to communicate this resolution to the proper officials.

PROFESSOR SAUNDERS' ADDRESS.

Professor Saunders, of the Experimental Farm, Ottawa, was then called upon and said: I have come here to-day in order to give you as far as possible the benefit of any information I may have with regard to the World's Columbian Exposition. In talking

the matter over with Mr. Buchanan, the chief of the Agricultural Department of the Exposition, he impressed strongly upon me the necessity of showing nothing but the very finest stock, as the competition from all over the world would be extremely keen. I ascertained that Canadian exhibitors would be allowad space for probably 150 sheep and 100 swine, and that only one animal in each class would be allowed each exhibitor. The conclusion that Mr. Wade and myself had previously reached was that we would require space for at least 200 sheep, but Mr. Buchanan appeared to think that this was more than Canada should ask for. I further ascertained that exhibitors will be required to provide all the help necessary for tending and feeding stock and for keeping the buildings in a cleanly condition. The facilities for transportation will be of the most perfect description. Water will be provided free, and fodder of all kinds will be sold on the grounds at reasonable prices, including such feed as may be needful for sheep at that time of the year, provision having been made for feed to be grown near enough to the exhibition grounds to insure its being fresh and succulent.

As regards the part that the Dominion Government is prepared to take in forwarding the interests of Canadian exhibitors, I may state that they are willing to pay the cost of shipment on animals both to and from Chicago. It is expected that the Provincial Legislature will supplement the assistance offered by the Federal authorities.

Mr. Russell.—It seems to me that the number of sheep allowed—150 for the whole Dominion—is altogether too small. Seven or eight different breeds will require representation, which will allow only about twenty animals in each class.

Prof. Saunders.—When I stated the number suggested by Mr. Wade, it was considered rather a liberal proposal on my part. Mr. Buchanan stated that they could not grant more space than was available, and that, although our territory was large, our population was very small compared with many of the countries which would need representation. Taking everything into consideration, he thought that he was dealing very liberally with us in allowing us space for 150 sheep. He said, "Let your people show the very best they have and nothing but the best. If they bring together 150 of the very best sheep that the country can produce, they will have an exhibit which no country need feel ashamed of." He further stated that, although the buildings for this class of exhibits covered 150 acres, it was evident from the number of applications they were receiving that they would not be able to meet the wishes of all. However, Mr. Buchanan expressed himself very cordially towards Canadian exhibitors, and assured me that every possible facility would be given them. I am sure I shall be quite ready to submit to the exhibition authorities any suggestions or requests that may come from the stockmen of this country, and if you think it absolutely necessary that we should have space for a few more sheep, I shall do all I can to see that the suggestion is complied with.

Mr. Jackson.—I would like to impress upon Mr. Saunders that, in the opinion of the sheep-breeders, the space suggested is too limited for a representative exhibit from this Dominion. From a glance at the prize list it will be seen that the classes are arranged in groups of say two, three, five, etc., and with this in view I fail to see how we are to make a fair exhibit with only 150 animals.

Prof. Saunders.—Only fifty-six sheep were exhibited at the Centennial.

Hon. Mr. Dryden.—It must be borne in mind that this province will of course only have a certain proportion of the 150—probably about two-thirds. I presume that they are considering Ontario from the standpoint of a State of the Union, and argue that if every State were fully represented it would practically monopolise all the space at their disposal.

Prof. Saunders.—In the case of horses, for instance, they expect to be able to accommodate about 2,000 in all, and they calculate that the proportion from Canada should be from 75 to 100. I presume that they have been working on a similar basis with regard to sheep.

Mr. Wade.—The great trouble is that everyone wants to have all the varieties of stock there at the same time, instead of having one class present one month and another the next; in that way there would be lots of room for all.

Mr. Jackson.—I would like to know how it is that in the prize-list regulations they state that two animals may be shown in each class?

Prof. SAUNDERS.—I think that the reference is to cattle and not to sheep. I was distinctly told that, so far as sheep and swine are concerned, only one in each class would be allowed. This is the memo. I made in my note book at the time, "That only one animal in each of the divisions of a class can be shown by one exhibitor." But I shall make further enquiry as to this point.

Mr. LINTON moved, seconded by Mr. JACKSON, that in the opinion of the Sheep-breeders' Association, the space allotted by the Exposition authorities is inadequate for a suitable exhibit of sheep from the Dominion of Canada, and that, in view of this fact, we request the authorities to extend the limit to 250. Carried.

Mr. GILLIVRAY.—With regard to the sharing of the expenses of an exhibit, I was on the committee appointed to consult with the Agriculture and Arts Association, and if I remember aright, it was considered a fair division if the Dominion Government undertook to pay the cost of transportation and the Provincial Governments undertook to provide a certain sum of money for the purpose of awards to be given for stock. It was further thought desirable to ask the Federal Government for a certain sum to pay attendance to and from Chicago, and also to defray the cost of attendance on stock while at the exhibition I am given to understand that the cost of board and wages for a man for this purpose would amount to at least $225, without reckoning incidentals, etc.

It was moved by Mr. Russell, seconded by Mr. Jackson that, in the opinion of this meeting, it is desirable that the Dominion Government should undertake to maintain a man at the Exposition to take charge, etc., of sheep during their stay. Carried.

Mr. TAZEWELL.—Can you tell me how the entries are to be divided?

Prof. SAUNDERS.—I am unable to answer that question at this stage. All I can say is that doubtless the division will be made as fair as possible to all parties.

Mr. MCCRAE.—I would like to know whether application for space can be made by private individuals?

Prof. SAUNDERS.—Every such application will be referred to me at once as the Canadian Commissioner. The control of the space is entirely in my hands.

Mr. MCCRAE.—I find by the catalogue that eight classes of sheep are allowed for and that 46 prizes are offered in each class, making a total of 368 prizes. No wonder they want us only to send 150 sheep; they want to get something for themselves.

THE FUTURE OF SHEEP HUSBANDRY IN CANADA.

Hon. JOHN DRYDEN, Minister of Agriculture for Ontario, was called upon and read the following paper:

Sheep combine in their products two essential requirements for the comfort and well-being of society, meat, which sustains the human body, and wool, which when manufactured affords warmth and protection. Changes will take place the world over; fashions may come and go; kingdoms rise and fall, but always men must eat and therefore meat will always be in demand; the human body will continue to need protection, and therefore wool will be required; so that, so long as man exists on this earth, sheep husbandry will have a place. Just how much of these products will be consumed depends somewhat upon whether the producer will undertake to supply the particular quality of either demanded by the consumer. For many years in the United States only one of these products was thought worth considering, and thousands of sheep were kept only for the wool annually produced, the carcasses when old being left to the birds and beasts of the forest. Changes in the market in time caused a less demand for the particular kind of wool then being produced, resulting in these latter years in eliminating entirely the profits in this particular line of sheep husbandry; so that to-day but few men contemplate the raising of sheep as a business without considering the possibilities of combining these two elements in the production of sheep, namely, meat and wool.

That two profits may be thus obtained is perfectly clear. The same carcass which produces a suitable quality of wool may, by judicious breeding and management, be brought to afford the finest quality of flesh as well. The difference thus obtained will in most cases be sufficient to convert an absolute loss in the industry in the one case to a

decided profit in the other. The sheep which combine value in these two products to the greatest extent will undoubtedly be the sheep found in Canada in the future.

The time is approaching when it will be impossible to sell at a remunerative price an animal having merely the name of sheep regardless altogether of the quality, either of meat or wool, and the sooner that time comes in this country, the better for all concerned. A discriminating market is the best of all markets to improve production. So long as persons will purchase inferior animals at the same rate as those of a superior quality, so long will carelessness and indifference be manifested by those engaged in their production. The moment the consumer obtains sufficient knowledge of what ought to be furnished for his consumption to refuse absolutely to purchase that which is entirely inferior and unfit for his use, that moment he becomes in the highest degree an elector of those engaged in any given industry and will eventually compel them to quit the production altogether or furnish what is demanded. There will never come a time when meat will cease to be consumed; somebody will always sell this product; but there will come a time when the inferior will go a-begging; when the man who produces only this quality will have to hunt for a customer and take whatever he is willing to give.

A good animal of any breed or kind will sell itself; will find its own market. It will command attention when that which is bad is ignored and neglected. When the market is overstocked, who is it that still sells at a paying price? It is the man who in the midst of dulness has still had an eye to perfection in his animals; who has never looked back but has pursued an even course toward high merit from the beginning, no matter what his circumstances as to market may have been; it is the man who has not studied so much what he is to receive, but who has been concentrating his powers on the production of animals of suitable merit.

There are those, and their number is too great, who, when the market drops, begin at once to lose interest in the quality of their animals, and who forthwith say, anything will do; there is nothing in it anyway; whereas they should double their energies if possible in the opposite direction; they should say, "Now that dulness reigns, I must take greater pains in my selection and management than before, and thus, as far as can be, produce such quality as will induce a demand." The old adage is still true; there is room at the top although the bottom may be very much overcrowded; and the man who reaches the top round will always find not merely remunerative prices but undoubted satisfaction as well in the prosecution of his calling.

In this country we may learn from the example given us by many of the breeders in Great Britain. It is in that country more than in any other that breeds have originated. How has this been done? Not by men who have merely had the motive of dollars and cents, but by men who have been imbued with the ambition to produce an animal of peculiar characteristics. Those who have been following sheep husbandry have had the ambition, if I may use the expression, to make a sheep with certain qualities of meat and wool. They have had a certain ideal before them, and year by year they have worked with the one object in view until finally they have accomplished their purpose. To some extent in Canada we have different surroundings; we may have to cater to a different market; but we ought to work somewhat on the same principles; and we may be sure that the man who thus accomplishes his purpose in completing the ideal that he has before him will always be the man who makes most money in his business.

Now, if you agree with me in the propositions I have thus laid down, the question will immediately be asked: What breed shall we obtain in order best to carry out this purpose? That question I cannot for several reasons answer; I must leave it to every man to answer for himself. If you desire to know my opinion, you must make enquiries as to what I do in my own practice; and that is the only answer I can give you as to my opinion of the particular breed which is best adapted for this purpose. It will be at best only an opinion, and although you may profit by my experience and by the experience of others who have for sometime engaged in this business, I advise every young man in the land not to become a mere copyist in this calling; I advise him to study his own surroundings and his own circumstances and to act independently for himself. It is quite possible that what is best for me may not be best for you, and therefore I ought not, if I so desired, to lay down hard and fast rules for any other man to follow. Because I

choose for the purpose I have suggested one particular breed of sheep, that is no reason why I should quarrel with my neighbor who chooses another. Only I desire to urge that we should all keep before us the one common object, that of producing in the highest perfection that which is demanded by our common market. But if you insist on merely copying what I do instead of using your own powers of observation, and your own judgment, we can never have much advancement in matters of this kind in this country. On the other hand, if our breeders will use the opportunities afforded—take advantage of the experience of those who are older and then think for themselves—there ought to be some among us who will carry this matter forward to a much greater extent than we have ever gone before. Prejudices ought not to be allowed to prevent a proper decision in this matter. There are hundreds of our people who are adhering to one particular breed or another simply because they are prejudiced either for or against. In this enlightened age a man ought to be willing to throw aside any prejudices and look at the matter entirely from an independent and unbiased point of view.

There are two things especially which will be needed in order to produce the desired result by those who wish to carry on this industry in the future; first, good judgment, and second, good care and management; the latter of course will include good food for the animals. The continued education of the people through the press, the influence of this Asssociation, and otherwise, will no doubt in the near future furnish those interested with all the information needed to enable them to pursue this calling according to the most approved methods.

It is clear that those who follow this industry in the future will be compelled of necessity to study the best methods that can be adopted to cheapen production. The object must not be to produce the heaviest animals, but to produce on a given area the greatest number of pounds both of meat and wool at the least possible cost. If three sheep weighing 150 lb. each can be produced at less cost than two sheep weighing 200 lb. each, then it is clear that it will be to the advantage of the breeder to produce the smaller sheep. This is a matter which needs constant observation and investigation, and if some of our pet breeds must be lost sight of because of this fact being made clear as against them, let it be so.

We must remember that in the future even more than at present we shall be compelled to meet in an open market the results in this particular department of the best intelligence and skill of the whole world. My judgment however is that, with the advantages which our excellent climate affords, if our people will but pay attention to the points suggested as to quality and a lesser cost of production, we shall be able to hold our own against all comers.

There is no one who has studied the sheep statistics of our province but is clearly convinced that there is abundant room in Ontario for much greater development in this important branch of agriculture. Most of us deplore the fact that our population during the last forty years has increased at so small a ratio; yet a reference to statistics will show that the increase in the production of sheep falls far behind what might be expected from the actual increase in population. In 1851 in the province of Ontario our population was 952,000. In 1891 it had increased to 2,112,989. The number of horses and cattle during that period, according to the last statistics of the Bureau of Industries, has multiplied by three. The number of swine has also increased in about the same ratio, but I find that the number of sheep has only increased by about half, the number being 1,050,168 in 1851 and 1,693,751 in 1891.

None of our domestic animals are more easily handled or produced with less labor and as little cost as sheep. Indeed a few sheep can be kept on every farm without the farmer being cognizant of much additional expense. This cannot be said of any of our other domestic animals, but notwithstanding this, the industry has not grown as we should like to have seen it.

It appears to me that, if we are to succeed in developing this industry in the future two things are necessary; first, our farmers must have the opportunity to sell both mutton and wool in the best market that can be found. This subject is considered a political one and perhaps ought not to be mentined in a paper of this sort, yet everyone must feel the force of the statement. So long as we are hampered in disposing of these products

where we could do it to the best advantage, so long will our farmers find reason in that fact for refusing to increase their flocks.

The second thing which seems to be necessary is more stringent laws for the protection of sheep against ravages by dogs.

The present law is certainly in advance of that which formerly existed, inasmuch as a man who allows his dog to run at large at night runs the risk of having him destroyed without legal recourse. This results in most cases in the dogs being confined during the night. Still it is a lamentable fact that hundreds of sheep are annually destroyed in this way. In the township of Whitby, in Ontario county, I understand that, during the past year, a sum exceeding five hundred dollars has been paid out of the fund provided for this purpose for the protection of sheep. An increase in the number of sheep means an increase of wealth, and sheep are, I assume, a necessity. Dogs add no wealth to the country and at best must be considered as a luxury. In my judgment, therefore, they ought not to be allowed to interfere with the development of this great industry.

Again, if sheep husbandry in this country is to be developed as much as is desirable, the attention of those engaged in it must be turned towards the necessity of furnishing the market with a regular supply of the best mutton. It will not do at certain seasons of the year to depend for a supply only upon old and worn out animals. One crop of lambs ought to be handled by the producer in such a way that from these a supply can be afforded until another crop begins to be offered on the market. If this were done, those who wish the finest quality and who are quite willing to pay for it would always be able to secure it. The habit of rushing all the lambs on the market during one or two months of the year results in demoralization in two ways; first, the prices at these seasons are almost sure to be brought down to such a low point that producers become discouraged and declare that the business does not afford a proper remuneration; secondly, the supply of the best article is thus in a short time exhausted, being forced on the market when perhaps it is not all wanted, so that later on in the season it cannot be had, and the attention of the consumer is turned from this valuable meat product to some other which can more readily be supplied. As a remedy for this, attention should be drawn through the press and otherwise to the desirability and necessity for these animals being held for a greater length of time by such of the producers as can afford to do so. By this means a larger sum per head would be realised. Already during this season those who decided to hold their lambs are reaping an excellent profit by so doing. This will doubtless continue for some months. It may be that everyone engaged in this business cannot do this, but let those who can give attention to it because they will be certain, if they have suitable buildings and plenty of feed, to reap a good reward by doing so. By the experiment carried on at the Experimental Farm last year, it will be seen that, should the American market be fully supplied, there is always a good market for a good article in Great Britain.

The intelligence, skill and industry of our people will supply all that is needed in addition, and will we hope eventually put Canada, and especially our Province, in the front rank in sheep production.

Mr. Dryden added: It has been suggested to me that I might say a few words as to what the Provincial Government intends to do with reference to the Columbian Exposition. I do not know that I can say much more than Professor Saunders has already said. I know, however, that the Ontario Government is anxious to do whatever can be done to make the exhibit creditable to the province, but I believe that it has not yet been fully determined as to just the best means to be employed to insure the most satisfactory results. I am sure that the efforts of the Dominion Government will be cheerfully supplemented by the Ontario Government. I would suggest that a committee be appointed with whom I might have the pleasure of conversing in reference to the matter. Further than this, I am not in a position to say anything in the meantime.

Professor J. W. Robertson, Dairy Commissioner for the Dominion, being present, was called upon to address the meeting. Mr. Robertson said:

Mr. Chairman and Gentlemen: I did not come here expecting to deliver an address this afternoon, but merely to listen; and at this late hour I am sure I shall not detain you. I am delighted, however, that you have recommended the names of a number of

gentlemen as suitable delegates to farmers' institutes. It is much to be desired that the branch of stock-raising which you represent, should be brought more prominently to the attention of the farmers, and that instruction should be afforded those about to make a start in the business of sheep-husbandry. Many farmers have land suitable for sheep that is not fit for anything else. They have suitable buildings, and also in many cases the necessary skill, and all they want to induce them to take it up is some encouragement from practical men. Take one word of advice from a man who has had a great deal of experience in institute work ; at these meetings a man must give his own personal experience, and state his own methods. If you follow this course, you will always have attentive audiences and do some good.

I think that sheep may be presented as animals of most economical habits. I do not know of any other animal on the farm that will use up what would otherwise go to waste, better than the sheep. A dozen sheep can be kept on any farm, and two score on most farms, without displacing anything else.

At the Experimental Farm we have no provision at present for keeping sheep, but it is the intention to have a sheep building erected this year, so that next fall we may have a number of different breeds of sheep there, and experiment with them as we are now doing with cattle and pigs. The importance of this work may be realised when I say that our reports are distributed over the country to the extent of two hundred and seventy-five thousand copies.

I am glad to know that this Association is doing such excellent practical work, and would recommend you as speakers to catch the same spirit. I believe in enthusiasm. If you are enthusiastic in your business, you will make others believe in it also. (Applause).

THE DORSET HORNED SHEEP.

Mr. J. A. McGillivray read the following paper :

When asked by the secretary of this Association to prepare a paper to be read before you to-day, I felt very much like declining. While I take some little interest in our sheep breeding industry, in which I have been engaged in a measure for the last seven years, and have thus learned many of its characteristics and requirements, (not to speak of the fact that, being a farmer's son, I was early accustomed to the sheep-fold), still, I could not presume to obtrude my views as to sheep-raising, and the best means of making it profitable, upon a body of men such as I see before me ; men whose lives have been devoted to the careful study of such matters, and whose ripe experience—acquired not only through reading, but by daily observation and multifarious experiments—has gained for them provincial reputations, and has placed them in the forefront of the stock breeders of this province.

However, having become attached to a class of sheep little known in this country, and after an acquaintance with them of five years, I concluded to present to you a short paper embodying what I know of the Dorset Horned Sheep. Not that I expect to wean you from your respective preferences, but perhaps to induce those of you who may not be altogether wedded to any of the other classes, to make a venture in our line, being firm in the conviction that, when these sheep are as well known as their fellows, they will be, at least, as highly appreciated by the farmers and others for their well established excellencies, as any of the other classes.

The Dorsets, as the name would indicate, are natives of the South of England, where they are found in large numbers in the county of Dorset, and also to a considerable extent in some of the adjoining counties. In Somersetshire may be found a closely related sheep known as the pink-nosed Somersets ; indeed, these two classes are now recognised as comprising one branch of the sheep family, and in England, I believe, are registered alike in the one flock book.

A few of these sheep found their way into Virginia and some of the southern states many years ago, attracting, however, but little attention. They first became really known to the Canadian and American people only some eight or ten years ago, the first importers thereof into this country being, I believe, Messrs. E. & A. Stamford, shortly afterwards to

be followed by Messrs. Tazewell & Hector, of the Credit, who have been the largest of our Canadian importers in the past, and the chief medium of their being brought to the attention of the Canadian people—the gentleman bearing the same relationship in this respect towards the farmers of the neighboring republic being Mr. Cooper, a Pennsylvania dealer and importer.

The Dorset is one of the oldest of the English breeds, and has been kept exceedingly pure and intact for a very long time. Originally they were small, though hardy, and noted for their fecundity and for their capability of living and thriving where other sheep would fare but poorly. However, as time advanced these sheep, as in the case of all other classes, improved by careful breeding, until now they have doubled their original size, and in the weight of the fleece, while they have lost none of the valuable characteristics above referred to.

The ewes will take the ram as soon as they have lambed, or rather within a few days thereafter; as a result they are capable of producing two lots of lambs a year, and, further, we can have our lambs come in any month of the twelve to suit our convenience. In England the ewes usually take the ram in April, and the lambs, coming in September, are fit for the Christmas market, where they are great favorites, as the mutton is highly appreciated for its sweet flavor. I might just say here in passing, that a year ago last New Year, I was offered by a local butcher $10 a piece for my fall lambs. While I have never brought in my sheep twice a year, considering it a too heavy strain upon them, I aim at bringing them all in three times in the space of two years, and have succeeded in so doing thus far. Some have argued that owing to a change from their natural climate, these sheep would not be as prolific here as in England, but in answer to this objection I would simply point them to the actual experience of our Canadian breeders. Last year I saw a sheep in the flock of Messrs. Tazewell & Hector, that had yeaned seven healthy lambs within the space of 14 months, and had succeeded in raising them all. I saw her with her third set, and a fine, healthy, hardy pair of lambs they were. At our last Industrial Exhibition I had a ewe in my exhibit that lambed on the 31st of December, 1890, and raised me then a fine large ewe lamb. In August following she presented me with two more fine lambs—which were at her side, a few weeks old, at the time of Exhibition to which I refer—and before the year 1891 had expired, she was again heavy in lamb. I have a flock of upwards of eighty sheep, nearly one-half of them being imported, and the rest of my own raising, and amongst them are to be found to-day, twenty young lambs ranging from a few weeks to two months old.

Judging from these facts it is quite clear to me that we need have no fear of their losing this particular feature of their valuable breeding propensities.

The ewes are large milkers and good nurses, and it is only rarely that a lamb is lost. In my experience I have lost but five: three of them last year through carelessness on the part of their attendant. They wean or throw their lambs off of their own accord as soon as they think them fit to care for themselves.

The young mature with amazing rapidity, and in the space of a few months grow to be almost the size of their mothers. A large proportion of the ewes produce and raise twins and triplets. Of my own flock, about half of my ewes had twins last fall. In the last edition of Stewart's Shepherds' Manual I find an instance therein referred to, that of a Mr. Pitfield, of Bradport, Dorset, England, who, as the result of one lambing season, found himself in possession of five hundred and fifty five lambs, from four hundred ewes.

They are, as the name indicates, a horned sheep, male and female. In my opinion the horns add to their beauty as well as furnish a useful means of handling them, doing away with the necessity of irritating or lacerating the flesh when in the act of catching them for shipping or other purposes.

They are as docile and as easily controlled and tended as the quietest of our well known breeds. Their fleeces, while not large in quantity, ranging from eight to fourteen pounds, furnish a fine quality of wool which is much appreciated and in great demand by our local woolen mills. In England the lambs are shorn for their fine fleeces of lamb's wool.

I have experimented in crossing with the common sheep, the Shropshire, the Cotswold and Southdown, and have the result of those crosses now upon my farm, which go to show

in no unmistakable terms that no better sheep than the Dorset can be had for crossing purposes.

The farmers in my neighborhood who have used my rams do not care to use any other. When crossed the sheep are much larger in size, as a rule, than the pure bred; the males having short horns for the most part, and the females none.

If you will excuse me for again making reference to my own flock, I would add that, knowing that I was expected to read a paper before you to-day, the day before yesterday I had my manager send down a yearling ram (now almost two years old), and a ram lamb (now about a year old), to the town market scales to be weighed, and I have in my pocket the weigh-bill showing that the former, which is not in good condition, and was only taken from the ewes three weeks ago, weighed 260 lb., and the latter, in no better condition, 170 lb. Had these sheep been fat, as you sheep breeders fatten sheep for exhibition purposes, you can each of you readily imagine at how very much more they would have turned the scales.

Now, in conclusion, Mr. President and gentlemen, I am not going to assume to say to you that this is the best of our many useful classes of sheep, but what I do wish to emphasise is that our sheep have many valuable properties and propensities that deserve, and should command, your careful study and attention. I am glad to notice that already some of our Shropshire friends are affectionately turning their eyes toward them, and are importing them in small lots, soon, I hope, to be followed by much larger importations.

When joining the American Dorset Association, a few weeks ago, I found that I was the sixty-third member, thus showing that on the other side of the line, at least sixty-two men are engaged in raising these sheep, although the Association is only one year old—a fact pregnant with hope of much further development in the early future.

To sum up, let me say that, in at least three particulars, they are, in my opinion, far in advance of all other sheep: (1) in their fecundity; (2) in their capability of lambing at the behest of the shepherd, at whatever season lambs are in greatest demand; and, (3) in the wonderful rapidity in which they mature during the first few months; while for docility, hardiness, and fine quality of flesh and wool, they compare favorably with all, or nearly all, of the other well known classes.

This is my message to you, very inadequately given, it is true, but still with the one desire to stimulate your thoughts and actions in a kindly spirit toward the Dorset, at a time when there is an approaching danger of over-importation on the part of the sheep-breeders of the province.

The meeting then adjourned till 7.30 o'clock, p.m.

EVENING SESSION.

The Secretary read the following communication from the Shropshire Sheep Breeders' Association and Flock Book Society of England.

College Hill, Shrewsbury, England,
December 1st, 1891.

Dear Sir,—At the annual general meeting held on Monday last, it was unanimously dedided to give a sum not exceeding £150 for competition in the Shropshire Sheep Classes at the World's Fair, Chicago in 1893.

Any suggestions as to the mode of its disposal we shall be glad to receive at an early date.

Also any information or enquiries respecting the breed will be readily furnished (gratis) by

Yours faithfully

Lythall, Mansell & Walters
Secretaries and Exporters.

MISTAKES IN SHEEP-BREEDING AND MANAGEMENT.

Mr. J. C. Snell, Edmonton then read the following paper:

While we are all no doubt agreed that it is desirable to avoid mistakes, yet someone has said with considerable truth that he who makes no mistakes seldom makes anyy thing. Even our mistakes may prove a benefit to us if we profit by them, and learn b our experience to avoid the repetition of them. There are some things, especially in the business of breeding and management of sheep, which are best learned in the school of experience, although it is a dear school in which to learn. There are many things in connection with farming operations generally which, while they look very plausible in some fine-spun theory do not work out in practice to the satisfaction of the enthuiastic theorist who often finds out at the end of his experiment that he has reckoned without his host. It is much easier to work out on paper in advance a balance on the right side of the account than it is to do it in actual practice. I have known more than one man who took an interest in a flock of sheep because he saw it figured out plainly that, counting the profitable natural increase, and the probable money returns from the sale of lambs, wool, sheep, etc., it was reasonably certain to prove a good and safe investment; but yet the result in the end proved disastrous to the investor. This does not go to prove that sheep raising is an unsafe and delusive business to engage in, but it does suggest a long list of mistakes and of gross mismanagement, whereas if they had been avoided the venture would probably have resulted more happily. It is but fair to say here that in most of the examples of failure that I have in mind the experiment was made on a comparatively large scale. I believe the results are not so easily to be controlled in such cases as in handling smaller numbers, especially when experience in handling large numbers is lacking. We in this country have almost of necessity to deal with sheep in comparatively small numbers. It is with this fact in view that I shall treat the subject and I may say at the outset that, as a rule, the man who without experience launches into the business of breeding pure bred sheep, is quite as likely to go wrong by over feeding and pampering, as is the man who chooses to keep scrub sheep to court loss or disaster by carelessness and neglect, It is largely a case of error in extremes with the right lying between. The "happy medium" is clearly the safest ground in sheep management. The choice of breeds is a phase of the subject upon which I am quite certain we shall never all agree, and perhaps it is just as well that this is so. Indeed if we did come to an agreement experience would probably prove that our conclusions were erroneous, for it is safe to say that no one breed is best adapted to all locations and circumstances, so that it may very properly be doubted whether, apart from all bigotry and prejudice, there is any best breed.

It is largely a matter of taste; of location of markets, of circumstances, environment and fashion. Every man should consider his own circumstances and surroundings as to these things and be governed accordingly. There is room enough in this broad country for all the breeds we have. Even in England, the home of the breeds, where the territory is very limited compared with our own, where there is much less variation in climate, etc., there appears to be room for all; and with their experience of centuries the *best breed* has not yet been discovered and probably never will be. We occasionally meet with a man who is not satisfied with any of the breeds; who thinks he could improve upon any of them by a judicious crossing and intermixture of the whole or of some of its parts; we have all seen the sad results of his genius in the mongrel and nondescript examples of the results of crossing the breeds. Those who undertake this business of breed making fail to comprehend what has been said with entire truth that ten men may be found qualified to be premiers in government where one can be found fit to be a breeder in the sense of originating and establishing a breed. Crossing is all right when the cross is made by the use of a pure bred ram upon grade ewes. The pre-potent influence of pure blood will certainly tell and the first cross generally is such a revelation to the inexperienced man that he is in danger of losing his head, as many of them do when they conclude that ram lambs resulting from that cross are good enough to breed from. Such lambs should all be castrated before they are a month old, and the best of the ewe lambs kept in the

flock to be crossed again on a pure bred ram of the same breed. If this course be continued the flock will steadily improve, taking on the type of the breed of rams used and roproducing it with comparative uniformity. But to cross one pure breed upon another is pure folly. The dangers and disasters arising from such fruitless experimenting are legion, and to undertake it simply means failure and disappointment. It is true that many if not all the breeds of sheep are the result of crossing, and, in the case of some of the newer breeds, of crossing one breed upon another, but we must remember that the work has been done by men of genius, with great experience, and in a country where sheep are kept in large numbers, and where the market for mutton sheep is always such that, in making these experiments in crossing, the culls, or those which do not nearly approach the standard aimed at, can be profitably disposed of. It is only by dint of many years of careful, patient, watchful labor by master breeders in crossing and recrossing, in breeding, and in-and-in-breeding, and by rigid culling that the breeds of to-day have reached their present standards of perfection.

But while all this is true, we would not counsel breeders to be content with what has already been done in the way of improving the breeds ; we believe that much can be done to improve even the pure breeds ; but let it be done not by going outside of the breed, but by judicious selection and mating to correct what are obvious defects ; to intensify the desired type very much can be effected in a few years by careful selection and feeding to change the character of the flock either in respect to fleece, form or size, and this is a praiseworthy and commendable ambition in any breeder.

Mistakes in management are manifold. Having made a selection of the breed he prefers, the inexperienced breeder will, especially if he has a full purse, be liable to put his money into some of the highly fitted sheep he sees at the shows ; superior animals no doubt both in breeding and individuality ,but the most dangerous as a rule for him to invest in. Fed on high-pressure principles from their birth, under careful and experienced feeders, the strong probability is that, treated as they are likely to be in the hands of their new owner or his hired man, they will go back, and, in the course of a year be but a wreck of what they formerly were. Yet with proper care and the use of good judgment in handling them, gradually reducing their condition by abundant exercise and moderate feeding so as to keep up their health and spirits, many of them may be made to do good service as breeders and to produce high-class stock. But the safer course for the new beginner is to buy as pure bred stock as the show sheep, but such as have been kept in natural condition and which may be safely kept in that condition.

The man without experience in the feeding and care of any kind of stock will, if he undertakes to feed sheep be liable to meet with losses and crosses that he did not look for, and it will as a rule be safer for him to under-do than to over-do the feeding. The flock will generally take care of itself during the summer months if allowed the run of the pastures however short they may be. It is in winter that the dangers are more imminent ; but if the feeding is restricted to clover hay and well cured pea-straw with a small ration, say a pint each of oats and bran per head daily, and a small quantity of roots, the flock should go through the winter with a very small percentage of loss from any cause. Of course there are minor matters which need to be attended to and attended to in time.

It is a mistake to neglect giving access to salt until the flock cries out for it and then to give it in such a quantity that some may take too much ; better place it where they can get it when they want it for then they will take only what they need. It is a mistake to conclude because sheep will live longer than any other animal without water that they do not require it ; give them free access to pure water at all times, and you may depend upon it that they will do better for it. It is a mistake to conclude because you don't see the ticks walking on the backs of your sheep that it is not necessary to use a preparation for preventing and destroying vermin. Sheep should be treated at least twice a year for this nuisance, even if there are no ticks or lice visible. It will pay many times over for the trouble and expense in the improved health and comfort of the sheep and the increased growth of wool.

It is a gross mistake to feed the lambs the first winter of their lives with the older sheep. They will be pushed aside and kept from the feed troughs ; besides, the young

things should have better feeding than the average of the flock; a little grain and a plentiful ration of roots should be supplied them.

I am satisfied that it is a mistake to allow pregnant ewes an unlimited supply of turnips or other roots. Sad experiences of sleepless nights; of weary watching and waiting upon helpless weak and washy lambs, a large percentage of which were consigned to the manure heap, taught me a lesson on that point so dearly learned that I don't propose to forget it. Of late years my breeding ewes have been kept away from home, far from the turnip cellar, so far that no man would think of carrying them any. Fed on dry feed with the run of a large yard, a small field and a lane, they have been kept in a rough and ready way, with the result that lambs come strong and vigorous, get up and help themselves, and require no coddling. When a man once lets the idea get possession of him that early lambs must have tender nursing, a fire all night, a basement stable or a double wall, a bottle of cow's milk sweetened with sugar, a supply of whiskey, castoria, glycerine, turpentine, sweet nitre, and Mrs. Winslow's soothing syrup, he will let it grow on him until he can't rest; will give his ewes such coddling that their lambs will need all this and will perish without it. But let the ewes roam about, get plenty of exercise, a bite at the earth and what little grass they can find where the ground is bare, and you need not lose much sleep caring for the lambs. They will be able to care for themselves with very little help.

I think it is a mistake when a ewe has produced a lamb that can get on its feet and help itself, to confine the ewe and lamb in a 3x5 pen with the object of feeding her extra well and giving the lamb a good start. In the first place, it is not easy to gauge just what amount of grain or other feed one sheep will take and the ewe is liable to be overfed, with the result that the lamb gets too much milk, while both get too little exercise. Presently the ewe gets stalled and will not eat as she should; the lamb is apt to get out of health too, and you find that your theory doesn't work right in practice; better throw down the bars and let the ewe run with others where the conditions are natural; where she has competition at the feed trough and receives stimulus in working for her share, which sends the blood coursing through her veins, giving vigor and tone to herself and to her lamb. I have very little faith in the feeding bottle with cow's milk for lambs; I am not sure, but I believe that it kills more than it cures. It should be the last resort. If a ewe has not enough milk to keep her lamb alive, I would give it a chance to get some from a ewe that had more than her own lamb needed. I would endeavor to get him enough ewe's milk to keep him going till I could find him a foster mother, or he got cunning enough to steal a living for himself; better let him go hungry a while than be "busted" with cow's milk.

There are many minor matters that would naturally come under the heading of this paper but time will not allow of all being touched upon; suffice it to say that one of the principal lessons to be learned by a consideration of mistakes is never to repeat them if you know it. Remember to promptly remove the causes of any sickness or disease; to immediately isolate a diseased animal from the flock, and generally to the slaughter house; to give prompt attention to any signs of lameness or soreness of the feet, applying simple remedies before the trouble gets deep-seated. Give your sheep frequent changes of pasture and roaming ground; give dry, airy shelter from storms, or at least a dry place to lie on; watch the eyes and ears of your sheep and learn to detect the first symptoms of ill health, then study the surroundings and environments to ascertain, if possible, the cause of the trouble, and at once try some reasonable means of prevention and cure. The art of detection of ailments in sheep comes only to those who are observant of the habits of the animal The careful, practical shepherd whose heart is in his work learns intuitively to anticipate and to provide for the wants of his flock.

QUESTION.—What sheep-dip do you use?

Mr. SNELL.—I have been using McDonald's and Little's tick destroyer with good success, but believe that it is not safe to use these preparations less than twice a year. I dip my lambs in the spring after the ewes are shorn, as the ticks are more liable to get on the lambs then than at any other time. At the beginning of winter another application should be given. I apply by opening the wool at intervals of four or five inches all over

the fleece and pouring in the preparation from an old tea or coffee pot. I never have any trouble with ticks. I never tried tick-powder.

Mr. PETER MCINTOSH.—I am not a member of your Association but, if it is in order, I would like to ask a question: What breed crosses best with our common ewes? I have a flock of Leicesters and have been using a Shropshire ram on them; I do not know but what some breeds might be more profitable than Leicesters, but the cross has given me good grade lambs which sell well on the market. I may say that I have not had much experience in this direction.

Mr. SNELL.—I think we should take the opinion of the meeting on that question. It is a delicate matter, and in associations such as this we generally try to avoid making special reference to the breeds in which we are particularly interested, as nearly every man favors his own breed. A man must be guided by his own judgment and observations

Mr. CRAWFORD.—In my experience, if you have large sheep and continually cross them on a smaller breed, the progeny will dwindle down to nothing. We tried a similiar experiment and our first lot of lambs were very satisfactory, but after the practice had been continued for two or three years the result was as I have said.

Mr. MCNISH.—I find that if such a course is followed, the only thing to do to keep up the standard is for a man to continually buy his breeding ewes. If that is a wise course then Mr. Snell's policy may be correct. The question is, which exerts the greater influence, the Shropshire sire or the Leicester dam? If Down crosses are continually used on the Leicester foundation, or on any of the larger breeds, your flock will soon dwindle down in size and the only way to keep it up is to continually buy your breeding ewes.

Mr. TAZEWELL.—Speaking from my English experience, some of the cross-bred flocks there have been in existence for twenty years and more. The custom is to divide the flock, and thus use black faced rams on white faced ewes, and vice-versa. By this means no difficulty is experienced in keeping up the standard. My father kept a flock in this way for eighteen years, and they were a fine lot of sheep to the last.

Mr. JACKSON.—I must certainly differ from Mr. Crawford on this question. I knew of a flock of Leicester ewes which were crossed with Southdowns for several years. These sheep took prizes in the show-ring. If you continually use a Southdown ram, the worst you will have in the long run will be a flock of pure Southdowns.

Mr. SANGSTER.—Some four or five years ago, I had occasion to attend a public sale where some black-faced lambs were offered in lots of three or four. They were the result of one or two crosses of a Shropshire ram on white-faced sheep. I did not really want them, but as they were going very cheap I secured seven, I think, at $3 each. The year following I bred them to a pure Shropshire ram. I have now continued this for six years and every cross brings them nearer to the Shropshire type, and if I continue for another year or two, I shall have practically pure bred Shropshires. I now have lambs that I am not ashamed to show to anybody. Some of my ram lambs last year were good enough to have encouraged some people to have used them for breeding purposes; but it is a great mistake to do that; on no account ever use anything but pure bred sires. I send my sheep to the Montreal market; with this object in view, I castrated these ram lambs, and after they had been shipped I received word that, if I could get seven hundred such lambs to send them down for the Christmas market.

Mr. MCGILLIVRAY.—I quite agree with Mr. Sangster's conclusions in this matter. I have frequently heard it reported that sheep deteriorate as has been suggested here to-night, but my observation leads me to believe that the effect of such crosses is rather the reverse.

Mr. SNELL.—There is a very great difference between crossing up and crossing down, and it appears to me that it is at this point where the difference of opinion arises. I think it is correct to say that, by using a ram of any improved breed, an improvement will be made all the time in the flock; this is grading up. Grading down is the result of using grade rams of the first cross instead of continuing to use pure bred rams. If a man uses grade rams, his flock will certainly go back to where it started.

HOW OUR FLOCKS MAY BE PROFITABLY INCREASED.

By John Tazewell, Port Credit.

When first I came to Canada from England six years ago, after seeing a good bit of the Dominion in hunting up a location, nothing struck me more forcibly than the very scanty flocks of sheep throughout the country as compared with the area of land occupied by each individual farmer; in fact, few sheep were to be seen, and, save in isolated instances where pure bred sheep of some kind were kept, sheep seemed to be the outcasts of the farm, no provision whatever being made for them in the cultivation of the farm, and in most instances they were left to seek their food on the roadside, little or no attention being paid to the improvement of their breeding qualities; they were simply sheep, and that's all one can say. I think, however, the day is near approaching when the Canadian farmer will be aroused to the fact that his flock is one of the most necessary, as well as the most profitable, things on his farm.

Having had considerable experience with sheep in the west of England previous to coming to Canada, I see no reason why many of the factors in the management of sheep there in vogue cannot be imparted here and carried out successfully to a very large extent. The result would be a vast improvement of the general cultivation of the land owing to the nature of the crops grown for the purpose, as well as the means of producing a large quantity of valuable food, both for home consumption and for exportation, thus becoming a source of considerable profit to the farmer in more ways than one. To carry this out it would require judicious management, and I would like to convey to you my idea as well as I am able, in a contracted form, of how I think this could be successfully accomplished.

Every farmer of 100 acres can quite easily in a very short time get his farm in a routine to carry one hundred sheep of the proper ages for an established flock, nor do I think that other farm stock need be much reduced in order to accomplish this. To do this successfully he would have to sow spring tares for spring food, provide pasture for the summer months, while the land on which the tares grew would be suitable for growing common turnips, swedes or rape for fall and winter food. I see no reason at all why turnips and rape cannot be fed on the land with the sheep in folds from the 1st September to the middle of November in this country, as well as any I have ever seen. We have the advantage here of a less rainfall, thus keeping the fold cleaner than it is possible to do in England. The common white turnip would be ripe by 1st September, and a portion of those should be sown for first consumption, with swedes to come at the finish. The turnips should be cut, of course, and placed in troughs, and the fold moved regularly, so that the field will get an equal quantity of manuring all over alike. The farmer must be his own judge about the quantity of acres of roots and rape to be sown; so much depends on the state of cultivation of the land upon which they are to be grown, that one can hardly estimate the number of acres necessary; however, that may easily be learned by experience. The following are a few of the advantages of folding sheep upon the land as I have suggested: First, the manure is evenly deposited upon the land; the farm is consequently rendered more fertile and less liable to be affected by unfavorable seasons, and I am certain that in this way one acre could, in a very few years, be made to produce as much as two under the present system; second, the land is cleaned thereby, and the annual crop of weeds, self-sown with each succeeding crop of cereals, would be exterminated.

Of course the suggestions here mentioned would apply more particularly to that class of land which is particularly adapted for growing roots, and could not be carried out here any more than in England on a stubborn clay soil.

In the raising of sheep this country has many advantages over the old county; there is no coathe, rot, foot and mouth diseases, foot rot, nor do maggots get into the wool; all those things are vexatious obstacles in England. There is not a doubt in my mind but that if sheep farming here had its proper share of attention in the shape of systematic management, it would prove remunerative as well as at home, where in lots of instances it is the main source of revenue of the farm.

The flock should be carefully selected and weeded out every year, and should be of a breed that the owner may fancy. Especial care should be taken in the selection of the ram to be used; this should be a great object of consideration, as you must bear in mind that upon the choice of the ram depends half of the future of the flock. I am bound to say that, as far as I have noticed, the average farmer gives but scant attention to this matter; of course, I am not referring to pure-bred flocks. The importations of the various breeds of late years have been so large that to procure a pure-bred ram now is not a very costly affair, and it will pay for itself ten times over.

Ram lambs, too, not intended for breeding purposes, should be castrated when about a mon h old or even younger, as their value either as spring lambs or as wethers is thus greatly enchanced thereby. This is another thing that is neglected very much in this country; if there is a bunch of sheep for sale in the markets here, there are usually a lot of rams with them. Now if we are to do an export trade with England, this must be avoided, as it damages the sale of the whole lot. It is by paying attention to those little things that will make sheep raising profitable, for, small though they are to attend to, their importance is great.

The wool, too, should receive careful attention and be well cleansed and cleaned from burs, etc. As the flocks of Canada increase this product will become more valuable, as there will be enough for a larger classification for the wool staples. As a general rule sheep are very badly clipped here compared with England. This has a bad effect, as it gives the flock (no matter how good a condition the animals are in) a miserable appearance for a very long time, to say nothing of the wool that is left behind.

Having tried somewhat roughly to show that it is possible to profitably increase the number of sheep now existing in Canada, it now remains for the farmer to well consider which is the most suitable breed for his purpose. Every breeder of the different kinds of sheep will naturally claim that his is the most profitable, etc. This is quite essential, because if we all fancied one particular breed, all others would become extinct; the farmer must suit his own taste and inclinations in this matter and be his own judge. It should be borne in mind that a sheep, of whatever breed it may be, is only worth in the end what its intrinsic value is in wool and mutton. As a breeder of Dorsets, I am, as you may readily imagine, an advocate of that breed, not altogether because I like their general appearance better than that of many other breeds, but because they possess important advantages in their capacity to produce lambs at any season, Christmas and Easter included. No other breed can be relied upon to do this. The crop of lambs coming in September may be sold for the Christmas market, while the second crop in the May following may be raised for breeding purposes. The first lot of lambs being cleared off so young does not strain the ewes much. The wool and mutton of Dorset sheep is of first class quality; they are very hardy and easily housed. These are some of the reasons why I fancy the Dorsets

Mr. SNELL.—I am very pleased that Mr. Tazewell has touched upon the subject of folding sheep upon the land. I have often wondered how it is that, although so many Englishmen come to this country with all their experience in this direction, the practice is never attempted here. I do not see why it should not be quite as successful here as there. I think that it would make a revolution in the profits from the land. I have not had much experience with rape, and even then have not folded it off in small portions as they do in England, but I have unbounded faith in it for feeding sheep and for breeding ewes. And if we can succeed in feeding rape on the land, I do not see why we should not also succeed with vetches and other crops in succession, so as to keep the sheep moving along.

Mr. SANGSTER.—One point which Mr. Tazewell's paper raises is that of our duty as breeders to impress upon the farmers the necessity for castrating all ram-lambs. It is very much to the farmers' interest to see that this is done, for otherwise the value of the lambs must be lessened. It is a simple operation and does not take long, but the custom still prevails of allowing them to remain entire with the idea of selling them to the butcher.

Mr. JEFFS.—The best plan is to castrate them in November and have them ready to market in February.

Mr. TAZEWELL.—You could not sell lambs at all in England unless they had been castrated. If this remains unattended to, the lambs are sure to have a strong flavor.

Mr. SNELL.—Is it safe to cut lambs at five, six or seven months old?

Mr. TAZEWELL.—Yes; I do not think that you need lose one in a hundred if the operation was carefully performed. I remember that some years ago there was an epidemic among lambs, and castration was put off until they were about a year old as it was thought that they would be stronger on that account. We did not castrate ours until they were a year old, and had no trouble at all. They were all seared of course. They always sear them in England. We used to castrate about 300 ram-lambs every year, and sometimes did not lose a single lamb.

Mr. MCGILLIVRAY.—Would you sear a lamb three or four days old?

Mr. TAZEWELL.—Not until they are about a month old.

Mr. MCGILLIVRAY.—I think that it is just as necessary to castrate ram lambs at an early age as it is boar-pigs. Something was said about cutting off the tails of lambs at an early age; at what age do you consider it safe to do this?

Mr. TAZEWELL.—At any time so long as the weather is suitable.

Mr. MCGILLIVRAY—We recently bought some shearlings with their tails on; what would you advise in that case?

Mr. TAZEWELL.—I would allow them to run until April.

QUESTION.—You spoke of rape as a good food for sheep; have you ever tried sowing fall rye?

Mr. TAZEWELL.—No; I never saw it done, but I have seen rape sown with oats in the spring. It was nothing of a crop in the summer time, but when the fall rains began and the oats were cut, it turned out a fine lot of feed. I never tried rye, but it seems to me that it should make excellent feed as there is so much growth about it.

Mr. F. R. SHORE.—The trouble with rye is that it grows too thin; but something might be grown with it which would overcome the objection; it comes in earlier than anything else. What is the proportion of loss from castration where searing is not employed.

Mr. TAZEWELL.—I never saw it done without searing. With regard to the necessity for castration, I think that the quickest way to teach the farmers would be to offer from twenty-five to fifty cents per head less on all lots of uncastrated males.

Mr. RUSSELL.—What is the effect of feeding roots to breeding ewes?

Mr. TAZEWELL.—The climate is different in this country and I can hardly say. In Somersetshire, where the sheep were nearly always on the arable land, we fed roots up to within a short time of lambing. Since I came here I have not fed many roots until after lambing. I cut the turnips for sheep of all ages; they go as far again. From five to eight pounds per head of turnips would be ample after the ewes have lambed. In very cold weather I would not feed roots to them at all, but in moderate weather you may do so with discretion.

Mr. MCGILLIVRAY.—You say that there is no foot-rot here; to what do you attribute that?

Mr. TAZEWELL.—I do not know what is the reason. It is a terrible pest in England; it is infectious, and does most damage in wet seasons.

Mr. MCGILLIVRAY.—We have wet lands here. If you had a wet springy farm, would you allow sheep so affected to run thereon.

Mr. TAZEWELL.—I think there would be no danger, but in England under such circumstances you would lose the whole flock. There are several things that I cannot account for; for instance, you do not get maggots in wool here, but they are a terrible pest at home. We are obliged to dip the sheep continually to keep the fly from operating. There are many advantages here in sheep raising.

Mr. MCGILLIVRAY.—What is the cause of soreness in the mouths of three or four months old lambs?

Mr. TAZEWELL.—It is usually taken from the ewe's udder.

Mr. NEADSON.—You spoke of sowing rape and oats together; how much seed per acre should be sown in that case?

Mr. TAZEWELL.—From five to eight pounds.

STANDARD FOR SHOW ANIMALS.

Moved by Mr. Jackson, seconded by Mr. Snell, That, whereas records are now established for the different breeds of sheep, it is desirable in the opinion of this meeting, that fair managers should make a rule requiring all sheep competing in the pure-bred classes to be eligible to record in their respective flock-books.

Mr. SNELL.—It appears to me that this proposition is a reasonable one. There is no good reason why rules which apply to cattle and horses should not also apply to sheep. Since we have established records for the different breeds, I do not see why the Fair Boards should not demand that show sheep be eligible for record as well as other classes of stock

Mr. RUSSELL.—I should think that the system hitherto followed is all the guarantee that is required; our judges would not approve of cross-bred stock. I suppose that under this resolution animals registered either in Canada or the United States would be accepted.

Mr. HAWKSHAW.—I do not see that it would be any trouble for exhibitors to bring their certificates in their pockets, and have them on hand to show to the judges if asked for. Most exhibitors are ready to sell their sheep if occasion offers, and should have their certificates with them in that event.

The motion was carried.

THE SELECTION AND CARE OF A SIRE.

Mr. Jas. Tolton, Walkerton, read the following paper:

There is an axiom, whether true or not I will not say, that the sire is a half of the herd or flock, as the case may be. That is, the sire contributes his characteristics whether good or bad to the offspring as much as does the dam.

That there is a great amount of indifference or lack of judgment displayed by the average sheep farmer in the selection of a sire to use on his flocks is only too apparent to any person who has had any experience at all in buying sheep. It is only too true that in many cases the buyer will find the lambs very deficient in quality. In some cases, perhaps, the fleece would give the impression that there had been a cross of the goat; then again, others instead of having a well-developed carcass of meat of the best quality are lank, lean and inferior in every way. For illustration: how often do buyers find one farmer whose lambs are only worth from $3.25 to $3.75 each while his neighbor's are worth from $4.25 to $5.00 each, simply because he has exercised more judgment in the selection of a sire to use on his flock. In such a case we see that there would be a loss of a dollar per head to the careless or indifferent farmer, and not only is this a loss to the individual farmer, who it is true is the most interested, but to the country at large.

Now it is not the object of this paper to dictate or advise as to what particular breed a sire should belong. This is a matter which must be left altogether to the individual taste and surroundings of the breeder. I might say here, to use the words of Mr. Treadwell, of Upper Wincheddon, Eng., a noted Oxford-Down breeder, that "It is a mistake on the part of any breeder to use a sire because he is low-priced. A few dollars more on a well-bred sheep of good quality is generally well spent money." As to the selection of a sire, Mr. Treadwell says, "First let him be true to character of whatever breed he may belong. He should have a good head, be of the right color and well covered (if in those breeds which are covered on the heads and legs) and masculine; he should have fairly straight legs; shoulders thrown back, and not too open; spine straight; rump not too heavy; leg deep and full; chest wide, and ribs well sprung and deep."

Next, as to the age. It was thought at one time, I believe, in England that a sire should not be used until he was at least past a year old, but now it is customary to use good strong lambs. In my experience I have found that for a small flock a lamb as sire fully answered the purpose; but, of course, if the flock is large a shearling or older sheep

should be selected. I believe that a sire when put with the flock should be in a good healthy, thrifty condition, but not overburdened with flesh for various reasons which it is not necessary to mention here. Next, mark when at service ; that is, dust some venetian red on his breast, first, that you may keep a record of the time of service ; and, secondly, that you may know whether he is performing his work in a satisfactory manner.

In conclusion, see that he is properly and closely attended to while at service. He should be given once or twice a day a quart or a little more of oats with a few peas mixed with them ; and, if a large amount of service is required, he should every night be put in a clean airy pen.

Mr. McGillivray.—I notice that you and Mr. Tazewell disagree as to the time when the rams should be kept from the ewes ; one suggesting the night and the other the day as the best time. I presume the object is the same in both cases—that the ram be not overworked. You say something about a ram-lamb being sufficient for the purposes of a small flock. I presume that breeders often take this statement wishing to get rid of their ram-lambs, but would you in selecting for your own purposes, on your own flock, get as good results from two or three ram lambs as say from one robust two year old ram ?

Mr. Tolton.—On my flock of Oxfords I have used imported ram lambs continually. As you may know, they are generally pretty strong lambs by the time they reach Canada, but I think that Canadian bred spring lambs with proper care and attention will serve from twenty-five to thirty-five ewes.

Mr. Jackson.—If a good, strong, well-grown lamb does not get good stock, he never will.

With votes of thanks to those who had read papers, and also to the Chairman and to the Secretary, the meeting adjourned.

ANNUAL REPORT

OF THE

DOMINION SWINE BREEDERS' ASSOCIATION.

To the Honorable the Minister of Agriculture:

I have the honor to submit herewith the Annual Report of the Dominion Swine Breeders' Association.

Your obedient servant,

F W. HODSON,
Secretary.

LIST OF MEMBERS.

Name.	P. O. address.
BREEDERS OF BERKSHIRES:	
Bonnycastle, F.	Campbellford.
Cowan, Wm.....	Galt.
*Coxworth, S.....	Clarem ont.
Davis, H. J.....	Woodstock.
Decker, C. R.	Chesterfield.
Dodd, G. F....	Melita, Man.
Ewing, J. B	Dartford.
Graham, D. A.....	Oakhill.
Heath R.	Mount Brydges.
†Jeffs, Edward & Sons.....	Bondhead.
King, J. H.	Uxbridge.
Lang, R. L.....	Oak Lake.
Lyons, S.	Norval.
McKenzie, J.	Beeton.
McNish, C. H.....	Lyn.
Martin, E. E.	Canning.
Rogers, G. F.	Plumas, Man.
Rudd, W. I	Eden Mills.
Sherman & Sherman.....	Souris, Man.
Shepardson, W. I.....	Walter's Falls.
Simmons, C. M..... ..	Ivan.
Sliffat, I. H	North Bruce.
Snell, J. C.	Edmonton.
Snell, J. G. & Bro.....	"
Vance, Robert.....	Ida.
Whiteside, T. M.	Ellesmere.
BREEDERS OF YORKSHIRES:	
Brethour, J. E.	Burford.
Brown, Alfred.	Bethel.
Chadwick, Robert	Burnhamthorpe.
Chapman, C. S.	Springfield-on-Credit.
Davies, Wm.....	Toronto.
Dorsey, R.....	Burnhamthorpe.
‡Featherston, Joseph	Streetsville.
Gilmour, A. & Co.....	Huntingdon, Que.
Glennie, James	Portage la Prairie,
Goodyer, Wm. & Son.....	Woodstock. [Man.
Green, Francis, jr....	Toronto.
Hall, Robert	Edmonton.
Hankinson, John D.....	Grovesend.
Hurley, J. M.	Belleville.

Name.	P. O. address.
BREEDERS OF YORKSHIRES —*Continued.*	
Medcroft, T. M.....	Sparta.
Ormsby, J. Y.....	Springfield-on-Credit.
Pike, Levi	Locust Hill.
Racey, John	Lennoxville, Que.
Smith Bros.....	Churchville.
Wright, A.....	Winnipeg, Man.
BREEDERS OF CHESTER WHITES:	
§Butler, Wm.	Dereham Centre.
Cairn, Joseph	Camlachie.
DeCourcey, D.	Bornholm.
‖George, E. D.	Putnam.
Harding, R. H.	Thorndale.
Quinton, R. W.	Walter's Falls.
Woodruff, J. A.....	St. Catharines.
BREEDERS OF POLAND CHINAS:	
Edwards, Ernest	Chatham.
Gould, James A.	Woodstock.
Payne, J. J.....	Chatham.
Smith, Robert	"
Smith, W. M. & J. C....	Fairfield Plains.
BREEDERS OF ESSEX:	
Main, James	Milton.
BREEDERS OF TAMWORTHS:	
Bell, John	L'Amaroux.
Gilbert, James	Thedford.
MISCELLANEOUS:	
Hodson, F.W. (Secretary)	London.
McClure, John	Brampton.
Ont. Agricultural College	Guelph.
Robertson, Prof. J. W.. .	Ottawa.

* Also breeder of Suffolks. † Also breeder of Yorkshires. ‡ Also breeder of Essex and Suffolks.
§ Also breeder of Victorias. ‖ Also breeder of Poland Chinas.

ANNUAL REPORT

OF THE

SWINE BREEDERS' ASSOCIATION.

THE FALL MEETING.

The Annual Fall Meeting of the Dominion Swine Breeders' Association, was held in the Board Room, at the Exhibition Grounds of the Toronto Industrial Exhibition Association, on the evening of September 16th, 1891. The President, Mr. J. Featherston, M P., occupied the chair.

The meeting was called to order at 7.30 o'clock p. m.

The report of the Committee appointed at the last meeting to consider what steps should be taken with a view to representation at the forthcoming Columbian Exposition, was first called for.

Mr. FEATHERSTON, M.P.—I have to apologise for the fact that this business has been neglected. I have been away from home during the summer on other business, as you are well aware, and have therefore not given that attention to the work that I should have done. I expected to have been home again long before this, and in that event I should have given it the requisite attention. Owing to my business at Ottawa I do not see my way to attend to the matter.

Mr. F. W. HODSON.—I would suggest that some one be appointed in Mr. Featherston's place, or that an entirely new committee be nominated.

The following gentlemen were therefore appointed a committee to wait on the committee from the Council of the Agriculture and Arts Association to discuss with them the matter of representation at the Columbian Exposition : F. W. Hodson, S. Coxworth and J. E. Brethour.

PORK FOR PACKING.

BY WM. DAVIES, TORONTO.

I am about to address you as a pork packer, not as a hog breeder, and it is possible I may tread on someone's corn's, if so I cannot help it. I shall nothing extenuate nor set down aught in malice, but shall strongly advocate what I believe will be the best interests of pork packers and consumers, and which of necessity will also be for the profit of the breeders and feeders of swine.

Every intelligent person, whether farmer, manufacturer, or dealer, knows right well that the nearer a product can be brought to the taste and wish of the consumer the better the price realised and the larger the quantity consumed.

It is somewhat singular that an animal whose flesh was forbidden to Jehovah's peculiar people, and was the synonym of everything unclean, should have become a staple article of food to dwellers in the temperate zone, and such being the case it is well worth the while of breeders and feeders to produce the animal that will most nearly meet the requirements and taste of those who consume it. Now as the maxim in cooking a hare is, "first catch your hare," so the first thing to attain the end suggested is, first catch the pig.

It is well known that the various breeds of animals have special characteristics. No one thinks of using a Clyde or a Shire as a roadster, and very few thoroughbreds are adapted to work on a farm or draw a coal cart. The same rule holds good among the various

breeds of pigs. The Cheshire White, the Poland China, the Essex, the Suffolk and the Berkshires are squarely built with a natural tendency to lay on fat which every year is held in greater abhorrence. It is true that a limited quantity of this sort is in demand among lumbermen and those who are interested in feeding their hands very cheaply, but in the towns and cities, and even among the farmers, there is an increasing and persistent demand for lean ham and bacon for which they are ready to pay a higher price ; in fact with the majority of consumers fat meat is utterly unsaleable. It is a great matter of satisfaction to our firm and other packers with whom we have conversed that the number of improved large Yorkshire boars that have circulated through the country within the last two years has very largely and favorably worked in the direction indicated, and among the hogs that we now take in at our packing house from one-third to one-half are white and without doubt are half-bred Yorkshires, and we can affirm that its cross has produced the beau-ideal of a bacon hog.

While I believe that the breed indicated is the best suited to further the end in view we rejoice at the enterprise of one of our competitors who has imported a large number of Tamworths. Personally I know nothing of their merits but I have read very favorable opinions regarding them by English bacon curers, and whether we get the long, lean fleshy hog from this source or some other I care not so long as the object sought is attained.

There are two points at which feeders should aim, first to have their hogs ready for market in June, July and August, as that is the time when packers can afford to pay the highest price, and I need not tell any intelligent farmer that one-half cent a pound may be the difference between working for nothing or feeding at a loss, and making a profit.

The next thing I want to impress upon feeders is to push their hogs along rapidly and not sell them till they weigh 180 lb., and 200 lb. would be better if they have the characteristics I have before mentioned. I see no reason to suppose that the industry is likely to be overdone, always provided we have the weight and quality indicated. Of course there will always be a considerable demand in a city like Toronto for pig pork, little fellows weighing 100 to 140 alive, but for packing in winter for sale in summer and for export we must have weight and thickness. We are sometimes asked if we will pay more for a load of Yorkshires. To this I would say we have never advocated the breeding of pure bred Yorkshires for slaughtering. We contend their value lies in their usefulness for crossing with other breeds or mongrels, and that I am not alone in this opinion I give you the following extract : " At a meeting recently of the West of England Bacon Curing Co. the manager stated a cross between the large Yorkshire and the ordinary breeds of the district make an excellent bacon pig."

The following probably many of you may have read in the last number of the *Live Stock Journal* of a report furnished by Mr. Reid, the U. S, Consul in Dublin to the American Goverment on the bacon curing industry of Ireland :

" The breed that is most preferred by curers is the Yorkshire. This breed is doubtless more extensively used in the vicinity of Limerick than in any other section of Ireland, largely through the efforts of the curers there. They have made special and vigorous efforts to secure its general introduction among the farmers, distributing—in many instances gratis—breeding animals among the farmers. As a rule, curers prefer pigs of the age of about nine months and from 126 to 140 lb. in weight."

This of course is dressed weight.

Referring once more as to paying more for a particular sort I would say that while that is hardly practicable, yet it is a fact that cannot be gainsaid that the nearer the stock of the country approaches the ideal the higher will be the price, and it is the interest of feeders not only to adopt the suggestions made, but to do all they can to induce their neighbors to follow in the same line. It will no doubt be in the recollection of some who hear me that the Hon. Mr. Dryden in speaking on the sheep industry and defending the Shropshires stated that he could have obtained a much higher price for lambs provided the farmers generally in the neighborhood had kept a similar quality. Then sufficient could have been bought to make it worth while for the drover to pay the extra price.

As I look back to thirty years ago when I began to slaughter hogs by first going into the country and buying them in the pens, then sending a man to slaughter them and burn the hair off with straw, and to a year or two later when I made the first attempt in Toronto, (having bought 100 or so from a drover who brought boars, stags and sows, with a few good ones) I do heartily rejoice in the great improvement that has taken place, but there is yet room for more. It is well known "there is always plenty of room at the top of the ladder."

The following matter deserves the attention of hog raisers: that is the sows should be spayed. They will feed much quicker, will make a much superior article, and be in every way more satisfactory to all concerned. This is largely done in the United States and almost universally in England and Ireland, where they pay a lower price invariably for what are called open sows, and we shall be obliged in Canada in self-defence to follow the same course. In urging this on the breeders, farmers and feeders generally, I am merely advising them in their own interest.

In conclusion let me urge farmers to raise more hogs, better hogs, larger hogs, and have them for sale at the time when highest prices rule.

Since the foregoing was written fat hogs have been offered in large numbers, but we are not now paying as much by three-quarters of a cent to a cent per pound as in the end of July and August. At that time we could make plenty of money, while now at the low prices the business is hardly worth doing. Could anything show more plainly that packers and farmers are really in the same boat?

Mr Davies concluded by saying: "Last year in one week we transferred $10,000 from our own pockets to the pockets of the farmers, which never came back to us because we failed to get the hogs at the right time. We wish to avoid that this season. This is one of the reasons why prices are so low at the present time. Our experience was not a solitary one by any means."

Mr. Chas. Simmons.—I am sorry that I was not present and did not hear the whole of Mr. Davies' paper. I agree with him, however, as to the desirability of having a uniform quality in a given neighborhood. The largest quantity you have in a given neighborhood, so long as it is of uniform quality, the greater will be the price obtained for that product. I learn from Mr. Davies' paper that he is largely in favor of the improved Yorkshire breed of swine. I believe that when these hogs have become Canadianised they will prove a still better hog. I have observed an improvement in some of these pigs and their progeny since they arrived in Canada. I believe that this climate has produced good results in general in the make-up of hogs. My opinion is that we want a good firm, solid pig. I like them rather light on the shoulder for my part. With all these breeds on exhibition here to-day, it seems to me that there is a great future before the swine industry here in Ontario, if the breeder will only devote his diligent attention to any one of the breeds and endeavor to breed an even hog. The Ontario farmer requires a hog that can be driven some little distance; one that can go eight or nine miles on its own feet; and I think this will be achieved before long.

Mr. J. E. Brethour.—I am a representative of the Yorkshire breed, and I quite agree with many of the statements made by Mr. Davies. I agree with him that the Yorkshires are splendid pigs to cross with other varieties. I think that it is the special aim of the Yorkshire breeder to modify the class of pigs first introduced into the country. I think we want a pig with a good heart, but I do not agree that a good shoulder is absolutely necessary. The shoulder has nothing to do with the feeding qualities of an animal although in may be considered a point of beauty. I do not think it is particularly an indication of strength. You want a pig with a strong loin, long quarters and well down in the thighs. With regard to pigs going to market on their own feet, I do not think the Yorkshires are as a rule a long-legged pig. We want the leg straight under the pig in order that he may have strength. As to feeding, I think we all ought to feed our pigs from birth. If you want lean meat this is the way to get it. The flesh of sparsely fed pigs is always on the outside; the proper way is to feed evenly all the time.

Mr. S. Coxworth.—I am not a breeder of Yorkshires; I breed Berkshires, and I suppose we are all inclined to believe our own breed the best. My experience is that a

good shoulder and a good heart are almost synonymous. Respecting the failure of pigs to go to market on their own feet, I think the principal reason for this is overfeeding. This point appears so far to have been overlooked.

The SECRETARY.—I desire to ask whether it is the intention to furnish members of the Association with the volume of the record free or whether the subscription fee is to be slightly increased. You are all aware, I think, that a deputation of hog breeders was appointed to wait on Hon. the Minister of Agriculture to request that the Association should be allowed a Government grant. I may say that the Legislature has allowed us a grant of $300, which is now I believe in the hands of our treasurer, or at least in the bank to the credit of the Association.

The PRESIDENT.—It is pleasing to think that the Government has thought so well of the Association's request. I think I almost guaranteed to you last spring that we should get this grant. We had some little difficulty in securing the number of members required by the Act, but I believe our Secretary has been able to overcome this objection, and I am sure we are thankful to the Government for the grant. We cannot accomplish anything without funds. I fail to see where the profit is to come in if the Association contributes fifty cents for registration and the Agriculture and Arts Association gives us the volume free.

SWINE RECORDS.

Mr. HENRY WADE, Secretary of the Agriculture and Arts Association, was then called upon to address the meeting. He said:

Gentlemen: I see by Mr. Hodson's circular that I am expected to appear before you and report as to the different swine records that have been commenced by the Agriculture and Arts Association from time to time. First comes the Berkshire record, commenced about 1876. We have now on record 1,830 boars, 2,096 sows, or a total of 3,926, enough for almost two volumes. We are now ready to commence printing the first volume and would be very glad to have your Berkshire committee come and inspect the pedigrees We have gone carefully over the old pedigrees and have cancelled all that could not be traced to importation on both sides.

The second swine record started was for Suffolks in 1884. This breed has not been pushed. We have only 143 boars and 139 sows, or a total of 282 recorded.

The third record was for improved Yorkshires, commenced in 1889. This has been a success, and no less than 354 boars and 466 sows, or a total of 820 have been recorded. This past summer I have commenced records for both Chester Whites and Poland Chinas and if I were to call numbers a success, they are both successful, although only a few gentlemen have recorded with us yet; but no doubt more will come in at once as our pedigrees are easier to understand than the family trees furnished by the American code. In Chester Whites we have a total of 374 on record, as I have dead-headed all the American previous entries in to make them complete. In Poland Chinas I have 668 on record in the same way, and only two or three gentlemen recording. I recorded one boar for the Smith Bros. of Fairfield Plains, and to register him I had to dead-head in 129 sows and 144 boars from the American Book, so you see a good deal of it is a labor of love to commence with. I have also been asked to commence a book for Tamworths, and shall do so as soon as the owners apply for their registrations. In all these cases our fees are 50 cents a piece to members of the Swine Breeders' Association, and if you say so, and charge your members another $1.00 a year, this Association could present each member with a volume free as soon as printed. If you can agree to have all the breeds in the same book we could present a handsome volume each year; if not let each breed pay an extra $1.00 to join its own branch of the Association. We could then print a book for each kind, in all these cases.

The PRESIDENT.—I remember that last year when we met it was thought that we would be able to register cheaper than this; that some parties intended to float an Association register independent of the Agriculture and Arts Association, but I think it would

be a mistake to attempt anything like that. I think a fee of fifty cents is low enough, especially where they have to dead-head so many. I think it means a great deal of work for the money the Association receives, and it might be well for us to discuss the subject and get an interchange of thought upon it.

Mr. BRETHOUR.—I think it would be a good idea to have all the different breeds put in the one book and published in the same volume, as many of our breeders represent several breeds.

Mr. J. Y. ORMSBY, V. S.—I agree with the suggestion made. I believe that nearly every breeder would be glad to see the different records bound together in the one volume. We could then watch what progress each breed is making from year to year, and see how near we are getting to one universal breed of hogs. (Laughter.) In England it is usual to combine together in this way. For instance, there is one book for the Berkshires, the small Blacks, the large, middle and small Whites, and the Tamworths. I think the best thing we could do is to have all the records in one book, and if we are agreed as to this, to get the book started without delay.

The PRESIDENT.—The matter of registration is of course in the hands of the Agriculture and Arts Association, and Mr. Wade's suggestion was thrown out in order to get the opinion of the breeders. I think we should make a motion to the effect suggested, and then Mr. Wade will know exactly what to do.

It was accordingly moved by Mr. BRETHOUR and seconded by Mr. COXWORTH: That this Association considers it desirable that the records of the different breeds of swine should be bound together in one volume by the Agriculture and Arts Association. Carried.

Moved by J. Y. ORMSBY, seconded by J. E. BRETHOUR: That this Association request the secretary of the Agriculture and Arts Association to charge non-members 50 cents extra for the registration of hogs. That the annual membership fee to this Association be $2.00 per year instead of $1.00 for all years when volumes of the record are issued, beginning with 1892. Each member to be supplied with a free copy of the Record, and that our treasurer be instructed to hereafter pay to the Agriculture and Arts Association $1.00 for each member, each year as soon as the Records are published. That our secretary shall annually supply the recording secretary with a full list of the member's names. Carried.

THE MOST PROFITABLE TIME IN A PIG'S LIFE TO FEED IT FOR THE MARKET.

Mr. LEVI PIKE, Locust Hill, next read a paper on the above subject:

The subject that I have chosen is a very important one and is of great value to us as breeders and feeders of swine.

I would say from six to nine months is the most profitable age. It is about time that farmers should see that greater profits are realised from feeding young animals than old ones. There are a few points that should be remembered. These are, that no single food is as good as a combination of foods, that good breeding will tell, and that common sense is just as necessary in swine breeding and feeding as in any other business. In a well bred hog that is growing and feeding right there is no time when it will make more pork for the food consumed than from ten weeks to six months of age, but this rule will vary somewhat in different animals.

Now comes the subject of feeding. Good breeding and good feeding are so closely related that they must go together; useless one without the other. By neglect we can run down a herd of pigs as fast as the best breeder can breed them up, and on the other hand we can feed up a herd of swine as fast as they can be bred up. In other words a good feeder but bad breeder can bring up a herd as fast as can a good breeder but bad feeder.

When the pigs are three or four weeks old, partition off a corner of the pen and place a small trough therein and teach the little pigs to eat. By the time they are eight weeks old take the sow out of the pen, and they will be weaned and won't know it. Following this course you will have no runts from weaning.

Do not make their slop too rich, nor make violent changes in the quantity or kinds of food ; do not give them more than they will eat up clean at one time, and do not feed at irregular hours. These are very important things in swine feeding. Some men claim it does not injure pigs to have food before them all the time, but I claim that it does. Let your pigs have a good appetite, and when the time comes for feeding they will speak for their food.

We have now improved breeds that have been under high pressure for years, the principal aim being to bring them to maturity at nine months when nature intended it should take eighteen. To accomplish this we have put them on heated concentrated food, crowded them to their utmost capacity to make them weigh from 225 to 300 pounds at from six to nine months of age, instead of at eighteen months. By this over feeding with heated concentrated food for many years we have gradually forced their early maturi y, which gives us an immature but profitable pig instead of nature's race-horse breed (scrub).

When a farmer feeds a pig beyond nine months he is needlessly throwing away his profits. Many are slow to learn this, notwithstanding, it has so often been demonstrated.

In conclusion let me say to those who are just starting in the business that your very best efforts are not too good ; and that the price of success is eternal watchfulness. It will be necessary for you to give the business your personal attention, and do not be afraid of soiling your clothes, if need be, to wait on your pigs, Lest I weary you I will close, trusting to those who follow to make plain any points I have omitted in this brief paper.

THE ECONOMICAL FATTENING OF SWINE.

The President then called upon Professor Robertson, of the Central Experimental Farm, Ottawa, to address the meeting.

Prof. ROBERTSON said : I am pleased to have an opportunity of making a few remarks to-night before the Swine Breeders' Association for the Dominion of Canada at its annual convention The associated effort of those who have been directly interested in the development of the manifold natural resources of Canada, has helped onward the prosperity of the country in a way which individual and isolated action could never have done. In agricultural matters particularly, improvement, advancement and profit have resulted from the intelligent co-operation and association of the leaders in every new movement, that had for its object the welfare of the farming community. The excellent and continually improving live stock of the country, is largely a product of the intelligent thought and guiding information, which the live stock associations have pressed upon the attention of the public. To our Dairymens' Associations is largely due the credit for the rapid extension of the dairy trade, particularly in Ontario. Until the Dairymens' Associations were formed, a business with great capability of service for the farmers languished. My observations on the whole course of progress in agricultural affairs in the country, lead me to expect great things from the existence and work of the Association, whose convention we attend here to-night. The branch of animal husbandry for the improvement of which it will direct its efforts, is by no means the least important to the farmers of the Dominion. The pig has been from time immemorial the despised and neglected animal of the farmyard, but he has been often the most profitable domestic animal kept about the farmer's place. Neglect and positively bad treatment have often prevented the swine from rendering to their owners the service of which they were capable. Tradition and sentiment have combined to injure the reputation of the pig, and the swine breeders have suffered some in consequence. Since the time of the prodigal boy's escapade, "to feed swine" has been counted a term of reproach. It will be no small thing if your Association succeeds in giving a standing of equal respectability to the business in which your members are engaged with that of horse-breeding, sheep-breeding and cattle-breeding.

In raising and feeding swine the most pernicketty attention must be paid to economy. Economical fattening of these animals must have reference to cost, to the quality of the flesh produced, and to the demands of the market which may be supplied. It will be

an economical practice on the part of the feeder to study the animal on purpose to find out his personal preferences. If he gets a fair chance, like other citizens, to do well for himself, he will do the most good for his owner. The pig has been libelled as a filthy animal; on the contrary he is quite cleanly in his habits, unless his early education has been neglected and he is left constantly under the influence of a bad example.

At the Central Experimental Farm, Ottawa, we are beginning to cross several breeds for the purpose of trying to discover whether an improvement cannot be effected, by mixing the bloods of the long and lean fleshed swine, such as the Improved Large Yorkshire and Tamworths upon the shorter and more lardy swine, such as the Berkshires and Essex. I have no preference for one breed over another; but in the selection of individual animals of the different breeds a few points may be of some service for those who have not studied the value and economy of form in the swine. Length and depth of body, with a small proportion in the way of offal parts, are desirable. A plentiful supply of hair, and fairly strong bones usually indicate robust constitution. In the management of breeding sows, care should be taken to see that over-lying in the pens is prevented. Crowding and over-lying are frequent causes for the birth of sickly, delicate and unwholesome pigs. A milking sow should receive a liberal supply of nourishing and succulent feed. Nothing could be better than skim-milk, bran, shorts, ground oats, barley or peas. If it be scalded or cooked, so much the better. Some one who is recognised as an authority on this subject, has said that suckling pigs at two weeks old will take three pounds of milk each per day from a sow. If a sow be nursing as many as 10 pigs, you will see what a drain that will be upon her system, and the milk of sows contains about one-half more solid substance per hundred pounds than the milk of cows.

It is economical to have the young pigs left to suck for from six weeks to two months. I have frequently had pigs at five and six weeks old gain four pounds each per week. It is often quite difficult to get a 200 pound pig to gain as much as that per week, and yon will recognise at once that a heavy and aged pig will consume a very much larger quantity of feed than the small porker. In the fattening of hogs for market, it is always economical to provide a warm sleeping place. A pig can stand without injury a very cold temperature, if it be protected against cold winds or draughts, but, from the thinness of its hair, no animal is more susceptible to chilling and icy blasts. The chilling often provokes a condition of constipation, and that prevents a thrifty use of the feed which is consumed. It is economical to provide a dry sleeping place for swine, and to this end it will be found advantageous to have the floors of the pen slope from the sleeping place towards the feeding trough, rather than from the trough down towards the sleeping place. If one side of a pen be kept clean for a week, the swine will fall into the habit of using it for their bed and will afterwards keep it clean themselves. For a condiment with their feed, I have found it profitable to leave a liberal supply of a mixture of salt and wood ashes within reach of the pigs at all times.

Let me cite here the results obtained in the fattening of swine on middlings when I had charge of some experimental work along that line at the Ontario Agricultural College, Guelph. Sixteen pigs in three pens were fed from August 9th to September 13th on wheat middlings only. From an average weight of 90.6 pounds each they gained up to 145.2 pounds each. Only 3.08 pounds of middlings were consumed for each pound of increase in live weight. On the other hand in feeding four hogs from Nov. 9th to Dec. 31st on wheat middlings only, they gained from an average weight of 226.2 pounds each, up to 291 pounds each. They consumed 5.75 pounds of middlings for each pound of increase in live weight; that is, the heavier hogs consumed 86 per cent. more feed for every pound of increase in live weight than did the hogs weighing 90.6 up to 145.2 pounds each. The following extract from my annual report of 1889, while at the Ontario Agricultural College, will give some further interesting data to those concerned in the feeding of swine:

The object in feeding the middlings was to prepare the three lots for an experiment in the feeding of corn-meal alone, pea-meal alone, and a mixture of barley-meal and middlings alone, in the fattening of these 16 hogs. The hogs of each of the three lots in pens 1, 2 and 5 were weighed every week. The meal in each case was fed, as were the middlings, mixed with cold water in the trough, immediately before the hogs had access

to it. They were fed three times a day, and each pen was allowed as much as the hogs would eat. In the tables I have arranged, the figures under *four* feeding periods of four, four, four and three weeks each.

Pen 1—Six hogs fed on corn-meal only with water and salt, Sept. 13th to Dec. 28th.

Feeding period.	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Corn-meal consumed.	Corn-meal consumed per lb. of increase live weight.
Sept. 13th to Oct. 12th	924 lb.	1184 lb.	260 lb.	1111 lb.	4.27 lb.
Oct. 12th to Nov. 9th	1184 "	1447 "	263 "	1174 "	4.46 "
Nov. 9th to Dec. 7th	1447 "	1666 "	219 "	1161 "	5.30 "
Dec. 7th to Dec. 28th	1666 "	1842 "	176 "	911 "	5.17 "
Sept. 13th to Dec. 28th	924 lb.	1842 lb.	918 lb.	4357 lb.	4.74 lb.

Pen 2—Five hogs fed on pea-meal only with water and salt, Sept. 13th to Dec. 28th.

Feeding period.	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Pea-meal consumed.	Pea-meal consumed per lb. of increase live weight.
Sept. 13th to Oct. 12th	726 lb.	945 lb.	219 lb.	1049 lb.	4.79 lb.
Oct. 12th to Nov. 9th	945 "	1140 "	195 "	981 "	4.77 "
Nov. 9th to Dec. 7th	1140 "	1390 "	250 "	1126 "	4.50 "
Dec. 7th to Dec. 28th	1390 "	1534 "	144 "	815 "	5.66 "
Sept. 13th to Dec. 28th	726 lb.	1534 lb.	808 lb.	3921 lb.	4.85 lb.

Pen 5—Five hogs fed on a mixture of barley-meal and middlings alone with water and salt, from Sept. 13th to Dec. 28th.

Feeding period.	Weight at beginning of feeding period.	Weight at end of feeding period.	Gain.	Food consumed.		Mixture of barley-meal and middlings consumed per lb. of increase live weight.
				Barley-meal.	Middlings.	
Sept. 13th to Oct. 12th	673 lb.	877 lb.	204 lb.	399 lb.	399 lb.	3.91 lb.
Oct. 12th to Nov. 9th	877 "	1070 "	193 "	436 "	419 "	4.43 "
Nov. 9th to Dec. 7th	1070 "	1275 "	205 "	486 "	489 "	4.75 "
Dec. 7th to Dec. 28th	1275 "	1403 "	128 "	351 "	361 "	5.56 "
Sept, 13th to Dec. 28th	673 lb.	1403 lb.	730 lb.	1672 lb.	1668 lb.	4.57 lb.

By comparing the quantities of feed consumed per pound of increase live weight by the hogs in pens 1, 2 and 5 on corn-meal, pea-meal and barley-meal and middlings respectively, during the the first eight and the last seven weeks the following results appear:

Feeding period.	Corn-meal.	Pea-meal.	Barley-meal and middlings
Sept. 13th to Nov. 9th.	4.36 lb.	4.78 lb.	4.16 lb.
Nov. 9th to Dec. 28th.	5.24 "	4.92 "	5.06 "

The increased per cent. of the consumption of feed per lb. of increase live weight in the hogs in the second period from Nov. 9th to Dec. 28th over the rate of consumption during the period from Sept. 13th to Nov. 9th is as follows:

In corn-meal fed hogs, 20 per cent. more feed per lb. of increase live weight.

In pea-meal fed hogs, 3 per cent. more feed per lb. of increase live weight.

In barley-meal and middlings mixture fed hogs, 21 per cent. more feed per lb of increase live weight.

Some more extended experiments have been carried on during the past year at the Central Experimental Farm, Ottawa. The following tables will illustrate the results from one series of experiments:

—	9th December.	5th January.	2nd February.	2nd March.	30th March.	27th April.	18th May.	Total.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Pen 1.—Four Swine—Fed on mixture of ground peas, barley and rye, fed steamed and warmed:								
Live weight	302	407	614	808	917	974½	745*	.....
Gain in weight	.....	105	207	194	109	57½	30	702½
Feed consumed	.....	348	737	736	545	406	256	2,928
Feed consumed per lb. gain in live weight	.....	....	.....	.....	....	.....	.....	4.16
Pen 2.—Four Swine—Fed on a mixture of ground peas, barley and rye, fed raw and cold:								
Live weight	308	413½	597	723	781½	830½	872	.....
Gain in weight	.....	105½	183½	126	58½	49	41½	564
Feed consumed	.....	348	563	558	413½	278½	237	2,398
Feed consumed per lb. gain in live weight	.....	.....	.....	.....	....	.....	.....	4.25
Pens 1 and 2—								
Average feed consumed per lb. gain in live weight	.....	3.31	3.07	4.04	5.73	6.45	6.93	.....
Percentage of increase in feed consumed per lb. of gain in live weight	.....	.....	...	31%	86%	110%	125	.....
Pen 5.—Four Swine—Fed on a mixture of ground peas, barley and rye, steamed and warmed, and sugar beets:								
Live weight	187	258	425	581	669	744½	812	.....
Gain in weight	.....	71	167	156	88	75½	67½	625
Feed consumed { Grain	.....	333	412	540	475	369	282	2,411
Feed consumed { Sugar beets	.....	43½	330	313	320	308	224	1,538
Feed consumed per lb. of gain in live weight	.....	.....	.....	.....	.....	.....	...	3.86 / 3.46
Pen 6.—Four Swine—Fed on a mixture of ground peas, barley and rye, fed raw and cold, and sugar beets:								
Live weight	201	272	415	547	692	731	772	....
Gain in weight	.....	71	143	132	145	39	41	571
Feed consumed { Grain	.....	225	396	503	458	371	270	2,223
Feed consumed { Sugar beets	.....	60	320	307	310	322	244	1,563
Feed consumed per lb. of gain in live weight	.....	.....	.....	.....	.....	.....	.....	3.89 / 2.73
Pens 5 and 6—								
Average feed consumed per lb. gain in live weight { Grain	.....	3.93	2.61	3.62	4.00	6.50	5.11	.....
Average feed consumed per lb. gain in live weight { Sugar beets	.....	0.72	2.10	2.15	2.73	5.52	4.33	.....
† Percentages of increase in feed consumed per lb. of gain in live weight	.....	....	.....	21 per cent.		90 per cent.		

* Three swine only. † 1 lb. grain, equal to 5 lb. sugar beets.

I desire to emphasise the fact that in one of these tests every pound of increase during the third month of the feeding period, cost 31 per cent. more than during the second month. During the fourth month, every pound of increase cost 86 per cent. more than during the second month. During the fifth month, each pound of increase in live weight cost 110 per cent. more than during the second month. During the sixth and last month, each pound of increase cost 125 per cent. more than during the second month.

The teaching of the whole volume of experimental work in this respect, shows the advantage of fattening swine up to a point between 180 and 200 pounds live weight.

The increase of cost for every pound of gain beyond that weight, makes the fattening of swine of heavier weights quite uneconomical.

I will say only a few words in regard to the effect of feeding, upon the quality of the pork and bacon. The market demand and the market price depend very largely upon the producer being able to furnish just the class of food which the consumer likes. The taste for very fat bacon from heavy sides or hams, is rapidly disappearing, if it has not altogether gone. The demand now is for lean meat of sweet flavor and tender body. These qualities can be obtained best in swine that are fattened continuously and fattened so as to weigh 200 pounds before they are 8 months old.

The following table will give some interesting and probably useful information on the effect of different feeds on the quality of the meat which is produced. It is taken from my report at the Ontario Agricultural College for 1889:

The live weight of each hog was taken immediately before it was killed, and the dead weight was taken immediately after it had ceased to bleed. The hogs were all scalded, scraped, dressed and hung up where they would not freeze. On January 6th the dressed weight was taken:

Pen.	No. of animal.	Fed on.	Live weight.	Dead weight.	Dressed weight.	Weight of lard on guts.	Per cent. of shrinkage from live weight to dressed weight.
7	1	Middlings and rape ensilage.	.....	.....	218½ lb.	5 lb. 2 oz.	14.3 per cent.
	2		.....	.....	254½ "	5 " 10 "	
	3		260 lb.	254 lb.	224 "	6 " 2 "	
	4		249 "	342½ "	212 "	4 " 14 "	
6	1	Middlings.	298 "	292 "	257 "	7 " 0 "	13.3 per cent.
	2		282 "	273 "	245 "	6 " 11 "	
	3		259 "	252 "	225 "	6 " 2 "	
	4		305 "	300 "	264½ "	6 " 11 "	
5	1	Barley-meal and middlings.	273½ "	266½ "	229½ "	7 " 9 "	15.6 per cent.
	2		283 "	277 "	242½ "	10 " 1 "	
	3		238 "	232 "	201½ "	7 " 14 "	
	4		298 "	291 "	251 "	6 " 4 "	
	5		253½ "	246½ "	211 "	6 " 0 "	
2	1	Pea-meal.	289½ "	282½ "	238½ "	7 " 14 "	17.0 per cent.
	2		288 "	282½ "	242 "	9 " 12 "	
	3		301 "	293½ "	246 "	9 " 0 "	
	4		279½ "	273½ "	232½ "	7 " 12 "	
	5		312½ "	305½ "	261½ "	6 " 15 "	
1	1	Corn-meal.	295 "	290½ "	257½ "	6 " 2 "	14.1 per cent.
	2		342½ "	336½ "	293½ "	9 " 0 "	
	3		241 "	235½ "	206½ "	6 " 10 "	
	4		332½ "	326 "	287½ "	5 " 13 "	
	5		283 "	276½ "	238½ "	8 " 11 "	
	6		277½ "	271½ "	237 "	7 " 4 "	

One hog of each lot was cut through in front of the shoulders, behind the shoulders and in front of the hams. It was intended to photograph these sections had the difference between the proportions of fat and lean from the different kinds of feed been decidedly apparent. The difference would not have been evident to the eye from an exact photograph. A few of the notes made on the spot are transcribed here:

Corn-meal Fed.—Lean meat rather brighter in the color than the others; equal to the pea-meal fed in firmness and proportion of fat and lean; lard more chalky in shade than others.

Pea-meal Fed.—The color of the lean meat hardly so bright as the corn-meal fed.

Barley-meal and Middlings Fed.—Color of the lean meat rather pale; larger proportion of lean to fat than in the corn and pea-meal fed; flesh and fat softer in body than in the two other lots.

In the following table is shown the order of quality under the three heads of "color," "largest proportion of lean to fat," and "firmness of flesh and lard."

Order.	Color.	Largest proportion of lean to fat.	Firmness of flesh and lard.
First	Corn-meal	Middlings and rape ensilage.	Equal { Corn-meal, Pea-meal
Second	Pea-meal	Middlings	
Third	Barley-meal and middlings	Barley-meal and middlings	Barley-meal and middlings
Fourth	Middlings	Equal { Corn-meal, Pea meal	Middlings
Fifth	Middlings and rape ensilage.		Middlings and rape ensilage.

In the economical fattening of swine some attention must be paid to the market end of the business. Of course, in this, as in other farm matters, the home end of the business is the important one for the farmer; and the reduction of cost and the improvement of the quality are two objects towards which he should bend his most strenuous attention and efforts. While the individual farmer can barely bring any appreciable influence to bear upon the market prices which he can realise at any stated period, he can so regulate his programme of breeding and feeding as to be able to market the most of his hogs at the time of the year when the market price reaches highest. Taking the Toronto market for illustration, I find that the average price in Toronto market for six years has been $5.47 per hundred pounds live weight. During the same period the average price for the three months (July, August and September) has been $5.78, while the average for the three months (November, December and January) in the same years has been $4.92. That shows a difference of 86 cents per hundred pounds in favor of the summer months

A pound of pork can be produced with much less feed during the warm weather than during the cold weather of our fall and winter. Hence, a much better chance for profit is left where the cost has been reduced by feeding during warm weather, and where the price has been enhanced by marketing before the cold weather and concurrent low prices have set in. It may interest the swine breeders also, to know that during last year the average price in Toronto market from June to November ranged at $1.10 per hundred pounds higher than the price in the St. Louis and Chicago markets. The superior quality of the bacon from our dairy farms and mixed system of feeding is further illustrated by the fact that in the British markets Canadian bacon and hams will sell for from 3 to 5 shillings per hundred pounds higher than similar products from the United States, mainly from corn fed hogs. All this points to the fact that in Canada swine-feeding can be carried on profitably when it is followed economically.

Mr. Ormsby.—I would like to ask if Professor Robertson has ever fed corn ensilage to hogs.

Professor Robertson.—It has not proved at all satisfactory in its results with us. I recently carried into effect one of my own plans of feeding a pen of pigs on pea-ensilage, but I did not find this satisfactory either, although I consider it better than corn ensilage. We feed on barley, peas, and sometimes sugar-beets. We have never tried corn ensilage alone.

Mr. Simmons.—Did you not find that there was an absolute loss in feeding steamed or boiled grain? There would be the loss of the time, etc.

Professor Robertson.—We had no return at all for our labor.

Mr. Simmons.—Did you get a profit on the grain fed at the market price?

Professor Robertson.—We got about a cent and a quarter per pound for the grain. We could keep no charge against the pigs for labor as they had to be weighed every week, but the bacon gave us rather more than a cent and a quarter per pound for every pound of feed. I mean that, if we had not tried to sell the grain at all except through the pigs, the price of the bacon would give us the same for the grain as though we had sold it at one dollar per hundred weight, and we could not have sold it last year for more than ninety cents. We would have had far more profit on the grain if we had killed the hogs when they were ready to kill, but we kept them a longer time.

Mr. Brethour.—I cannot agree with Professor Robertson as regards boiling feed. I feed boiling feed and give lots of middlings in the winter, and find that the hogs do

very satisfactorily. I mix boiled barley and peas. My pigs have very good health and grow very fast. I cannot get them to eat raw feed afterwards.

Professor ROBERTSON.—In the case of sows with litters of pigs, it will pay to boil feed, and I do not think you will get a sow to milk so well any other way.

Mr. BRETHOUR.—Do you prefer boiling or steaming; do you not think there is more loss with boiling than with steaming?

Professor ROBERTSON.—You only lose water by evaporation; you do not lose the feeding substances.

Mr. BRETHOUR.—I have been informed that food is not so digestible when steamed as when boiled in water; I heard a professor at one of our institute meetings make this statement.

Mr. SIMMONS.—My opinion is that there is an absolute loss in either steaming or boiling feed. In every bulletin I have ever read on the subject, it has been proved a failure by actual test. There has been an actual loss in value as well as of time spent.

Mr. ORMSBY.—The year before last I had a great many small potatoes, and boiled them together with turnips and mangels. My pigs grew well and fattened early on this feed: in fact, they were never better than that year.

Professor ROBERTSON.—It is clear that the boiling of food renders it more digestible. In the case of potatoes, for instance, which are nearly all starch, the process of boiling puts them in such a condition, by exposing more surface, that they may be more readily acted upon by the digestive fluids in the stomach.

Mr. SIMMONS.—If you are feeding a lot of coarse food it is perhaps an advantage to feed it cooked, but when you are feeding concentrated, fat-producing food, I do not consider cooking at all necessary.

Captain BUNBURY.—Is there any objection to feeding cotton-seed meal to pigs?

Professor ROBERTSON.—I have it on my list of experiments for this year's work. I have not learned of anyone feeding this meal to swine with success, but I propose to try it, giving them a small quantity at a time.

Captain BUNBURY.—I killed three of my pigs with it and then I stopped.

Professor ROBERTSON.—If we give our cattle about a pound and a half per day, we find that they do well enough, and I intend to try this plan with the pigs.

Mr. ORMSBY.—It is used in England all the time with success, but I tried it the year I was shipping to Toronto, and in every case the cows slipped their calves. I have repeatedly found this to be the case here, and I have given it up on that account.

The PRESIDENT.—I believe the objects and aims of the Association are being appreciated because our meetings have been so well attended hitherto. I am particularly proud of the meeting we had at the Albion Hotel. We had one of the most influential and enlightened audiences of any live-stock association I have met with at any time. I am pleased also to find that some of the sheep-breeders are taking part in our meetings. I am glad to see the sheep-breeders and the swine-breeders associating together for the benefit of the stock interests of this country.

Mr. JOHN JACKSON.—When does our membership end? Does it not end in the spring of the year? I presume that those joining the Association now will only pay one dollar for the balance of the year.

The SECRETARY.—Those uniting with us now only pay one dollar for the balance of the year; and in any year that there is not a number of the record issued, the membership fee will only be one dollar.

After the subscriptions of new members had been taken, the meeting adjourned.

ANNUAL MEETING

The Annual Meeting of the Dominion Swine Breeders' Association was held on February 5th, 1892, at Shaftesbury Hall, in the city of Toronto; J. C. Snell, Edmonton, in the chair. The meeting was called to order at 2.30 o'clock p.m.

After the minutes of the previous meeting had been read and adopted, the Secretary presented the following report for the year.

SECRETARY'S REPORT.

As many of the members present were not united with us when this Association was founded, I think it wise to give a short sketch of the work from the commencement. On Sept. 19th, 1889, I was asked to call the swine breeders together and assist in forming an association. After some hesitation I consented to do so. The first meeting was held on the evening of the above date in the office of the Agriculture and Arts Association, corner Yonge and Queen Sts., Toronto. All the prominent swine breeders then in the city were present. The constitution now governing the Association was adopted. Each year since then we have held two meetings, one in the spring and one in September. Each of these several meetings has been well attended, and much valuable information has been scattered all over Dominion by our efforts. Until the year 1891 we received no aid from the government; but at the annual meeting held March 19th, 1891, your Secretary and two others were appointed a deputation to wait on the Hon. John Dryden, Minister of Agriculture for Ontario, and lay before him the claims of this Association, and respectfully request that we be given a grant of at least $300, to assist us in carrying on our work. Your committee met the hon. gentleman, who after hearing us, and carefully enquiring as to the work accomplished by our Association and its future aims, graciously promised to do what he could in the matter. The result was that in August last, our treasurer received a cheque from the Provincial Treasurer for $300, the the amount asked for by us. At our first meeting in 1889, our membership was sixteen; we have now sixty-nine who were considered paid up members for 1891, twenty-nine of whom had paid their fees before the end of the previous year, but by a resolution I was instructed to mark them as paid members for 1891.

I have carefully watched the workings of other associations which receive government grants, and I believe that we are doing as good if not better work than any of them, considering the smallness of our grant.

What our Association requires is more members; and what we must and will have is more members. We want every one of our members to act as a missionary, and send to the secretary the name and fee of at least one new member each year. Every one of us should try to induce four or five others to join. Our officers especially should be active and energetic in forwarding the interests of the Association in every possible way, but especially by adding new members. No one should allow himself to be elected to office if he cannot or will not work whole-heartedly and earnestly for the general good.

Heretofore, on account of the shortness of funds, we have not been able to publish an annual report, but one will be issued at an early date in which will be reported all our previous meetings as fully as possible. Each year hereafter one will be issued and a verbatim report will be given of our last meeting and this one. On the first pages will be published the names and addresses of all the members, and in each case it will be specified what sorts each member breeds. This will be found a cheap and valuable advertising medium.

I had a conference with the Hon. the Minister of Agriculture on Monday last, when he consented to publish our annual report. This will effect a considerable saving to the

Association and will allow us to use our grant to forward the swine interests in other directions. I would suggest that a deputation be sent to the honorable gentleman to request him to send a copy of our report to each member of the farmer's institutes in Ontario. This would be a great benefit to the farmers and be the means of largely increasing our membership and our field of usefulness.

At our last annual meeting it was decided to commence records for the different breeds. Mr. Henry Wade was appointed Recording Secretary and our Executive the Editing Committee. Up to the present date there have been received for registration 4,074 Berkshires, 938 Yorkshires, 292 Suffolks, 435 Chester Whites and 868 Poland Chinas. Members of our Association are charged 50c. per animal to register and 25c. to transfer. Non-members are charged $1.00 per animal to register and 50c. to transfer.

As previously stated we have since 1889 held two meetings each year. I would suggest that hereafter we hold but one, and that it be an all day session and if necessary longer, so that we may be enabled to get up a good annual report. That the time of holding such meeting be in December, and that we join with the Guelph Fat Stock Club or some other association or associations in order to assist in holding a good fat stock show. Of course or efforts will be entirely given to the swine department. Without any increase in our grant for 1892, with our present surplus, we could offer at least $400 in premiums in December next. From such an exhibition if properly conducted, much valuable information could be gleaned. Each exhibitor in our department would be required to furnish such written statement as our executive may require. Matter thus obtained would be very suitable for publication in our annual report. By this means we may lay or assist in laying the foundation of what will in the future become Canada's great winter exhibition, the veritable Smithfield of America, of which the Canadian breeder and farmer will have full control.

Another matter to which I would like to draw, your attention is the appointment of gentlemen to address the farmers' institutes. The Ontario Department of Agriculture, in connection with Prof. Mills and the Executive of the Central Farmers' Institute, appoint lecturers to address institutes in various sections each year. Other associations have had the privilege of nominating speakers. I think it would be wise for this body to select, say three gentlemen, and to respectfully request that they be placed on the staff of lecturers, and that their duty as lecturers be confined to addresses on swine husbandry.

APPOINTMENT OF DELEGATES FOR FARMERS' INSTITUTE WORK.

Professor Dean, O. A. C. Guelph.—Before the Secretary's report is adopted, I would like to say a few words regarding delegates from this Association for the farmers' institutes. The only Association that is at present represented on the Institute delegations is the Fruit Growers'; but at the meeting of the Eastern Dairymen's Association it was proposed that the dairying interest should be represented thereon, and I understood that, at the meeting of the Sheep-Breeders' Association yesterday, a number of gentlemen were selected for this purpose also. It seems to me that considerable difficulty is likely to be experienced in disposing of all these delegates. In my experience in institute work, three men are all that are required for each delegation, and further, that those meetings are always most successful at which the local men take a prominent part and introduce subjects for discussion. In view of this, I do not think that it will be found practicable to have all these associations represented on each delegation.

W. Cowan, V.S.—It is true, as Professor Dean stated, that the Fruit Growers' Association has a representative on each of the delegations sent out. I was present at the meeting of the Central Farmers' Institute at which this motion was passed, and in the opinion of many, it was allowed to slip through without proper consideration, and it was thought at the time that the fruit growers had been given an advantage which would be apt to crowd out all other Associations. I think that if the sheep and swine breeders will lay their heads together they might get advantage of some of the time at least that has hitherto been allotted to the subject of fruit-culture.

Mr. J. E. Brethour, moved, seconded by Mr. Harding, That the Association name, Dr. Cowan and Mr. Snell as suitable representatives of the swine breeding interests of the province on the staff of Institute speakers.—Carried.

Mr. Brethour.—This Association has no interest to represent other than the swine interest, and I think that due prominence should be given to the subject by the gentlemen selected.

Mr. W. H. McNish.—The swine industry is one of the most important in this country, and I think it a step in the right direction to have at least three of our members at the institute meetings to "talk hog." As has been suggested, I think that it would be well for our delegates to work up one district one year and another the next. When the whole province has been covered in this way, we can step out and give place to other interests.

Mr. Snell.—Perhaps it would be well to name a larger number to select from, in case it should happen that one of the gentlemen is not able to undertake the work for any reason.

Mr. Simmons.—I have much pleasure in nominating Mr. McNish and Mr. Brethour for the purpose. I think it is well to let the Minister of Agriculture have a choice of speakers for the work. Seconded by Mr. Tazewell and carried.

PRIZES FOR FAT STOCK.

Mr. Wade.—I suppose that the idea is to vote a sum of money towards the prizes in the swine department of the show. We have voted $1,000 to be distributed in prizes for fat stock this year, but we have not decided where it is to go.

The Secretary.—If the Agriculture and Arts Association gives $1,000 and we give $400, it would insure a very fine show.

Mr. Simmons moved, seconded by Mr. Coxworth, that, as suggested in the Secretary's report, one meeting of the Association be held each year instead of two ; that the date of the annual meeting be changed to December ; and further, that the question of offering prizes for fat stock be left in the hands of the Executive Committee. Carried.

The Secretary's report was then adopted.

TREASURER'S REPORT.

The following report of the Treasurer was then read and adopted :

Receipts.		Disbursements.	
Members' fees	$40 00	Directors' fees and expenses	$5 25
Legislative grant	300 00	Postage and stationery	14 49
		Printing	12 40
		Lecturers' expenses	10 00
		Reporting	5 00
		Asscciation stamps	4 75
		Balance on hand	288 11
	$340 00		$340 00

Examined and found correct.

Robert Beith, Francis Green, Jr. } Auditors.

Toronto, February 5th, 1892.

SECRETARY'S SALARY.

Mr. HARDING.—I do not observe any item for the secretary's salary mentioned in the report. I would like to ask him what remuneration he receives for his services?

Mr. HODSON.—Up to the present time no salary has been given to the secretary. I might state also that I have in the past paid out sums from my own pocket to defray different expenses of the Association amounting to some fifty dollars. I sent vouchers for these amounts to our late treasurer, but failed to hear anything from him in this regard and have not therefore yet been recouped.

Mr. F. GREEN, jr., moved, seconded by Mr. DECOURCEY, that our secretary be awarded the sum of fifty dollars as a slight recognition of the many services rendered by him to this Association during 1891; and all past disbursements in behalf of the Association be allowed him, and that the amount he shall in future receive be left to the Executive Committee to decide. Carried.

ELECTION OF OFFICERS

According to the report of the nominating committee, the following gentlemen were elected officers of the Association for the ensuing year:

President, J. C. Snell, Edmonton; Vice-President, D. DeCourcey, Bornholm; Secretary-Treasurer, F. W. Hodson, London.

Directors—*Yorkshires*, J. E. Brethour, Burford; *Berkshires*, S. Coxworth, Claremont; *Suffolks*, R. Dorsey, Burnhamthorpe; *Essex*, James Main, Milton; *Chester Whites*, R. H. Harding, Thorndale; *Poland Chinas*, J. J. Payne, Chatham; *Victorias*, Wm. Butler, Dereham Centre; *Jersey Reds* and *Tamworths*, John Bell, L'Amaroux.

Auditors, F. Green, jun., Toronto, and F. R. Shore, London.

EXPERT JUDGES.—The following gentlemen were recommended to the various Fair Boards as suitable to act as expert judges in the respective classes:

Chester Whites.—J. R. Featherson, Springfield-on-the-Credit; John Jackson, Glenallan; George Pierce, Mitchell; S. H. Todd, Wakeman, Ohio; John Taylor, Thorndale; James Anderson, Guelph.

Poland Chinas.—Sharp Butterfield, Sandwich; C. H. McNish, Lyn; W. G. Baldwin, Colchester; James Anderson, Guelph; Joseph Yuill, Carleton Place; James Main, Milton.

Suffolks.—Sharp Butterfield, Sandwich; Samuel Mason, Hornby; Malcolm McArthur, Lobo; William Elliot, Milton; John Fothergill, Burlington.

Berkshires.—W. H. McNish, Lyn; J. G. Snell, Edmonton; George Green, Fairview; H. J. Davis, Woodstock; S. Coxworth, Claremont; S. J. Lyons, Norval; Alex. Cameron, Ashburn; R. Vance, Ida; J. C. Snell, Edmonton; C. M. Simmons, Ivan.

Essex.—Sharp Butterfield, Sandwich; James Anderson, Guelph; James Main, Milton; Thomas McCrae, Guelph; David McCrae, Guelph; Wm. McCrae, Guelph; Bilton Snarey, Croton.

Tamworths.—Joseph McGavin, Chatham; P. W. Boynton, Dollar; D. G. Holmes, Willowdale; B. Rolph, Orono; Wm. Davies, Toronto.

Yorkshires.—Alfred Brown, Bethel; Levi Pike, Locust Hill; W. H. McNish, Lyn; Wm. Davies, Toronto; J. E. Brethour, Burford; Sharp Butterfield, Sandwich; G. S. Chapman, Springfield-on-the-Credit.

DELEGATES.—The following gentlemen were appointed delegates to the respective Fair Boards for 1892:

Toronto Industrial—J. C. Snell and Robt. Dorsey; *Western Fair*—C. M. Simmons and D. DeCourcey; *Ottawa Fair*—Joseph Yuill; *Montreal Fair*—W. H. McNish; *Kingston Fair*—Alfred Brown; *Hamilton Fair*—W. Cowan, V.S., and J. E. Brethour.

Mr. J. C. Snell and Mr. F. W. Hodson were re-elected to represent the Association on the committee for the World's Fair.

THE WORLD'S COLUMBIAN EXPOSITION EXHIBIT.

Mr. BRETHOUR.—With regard to this matter, it appears to me that one hundred animals, the number allowed us by the Americans, are quite few enough to represent the different breeds of swine in this country. I think that it would have been well had the committee gone over the list and ascertained how far this number would permit of there being a representative in each of the classes allowed. The estimate seems to me to be altogether too low. I move that this Association requests Professor Saunders as the representative for the Dominion to endeavor to get the limit extended to one hundred and fifty animals, or to whatever number may be required to give us one representative in each class. Seconded by Mr. McNish and carried.

The following paper was then read by Mr. F. W. FEARMAN, of Hamilton, entitled:

NOW AND THEN.

The history of the hog is an interesting one, and dates back to very early times; he has survived changes that have swept great numbers of other animals from the face of our earth. He is still here, however, and has the same characteristics, but is much improved compared with the hog of former periods, and is now one of the most necessary and most valuable animals in the use of mankind.

Although in the Scriptures and elsewhere the hog is generally referred to as having a cloven hoof, there are several exceptions to this, as in Norway and in Sardinia, and formerly the Berkshires of England had an entire hoof. I remember having seen the same peculiarity here years ago.

In many parts of the world the hog is still found in its original wild state, and is hunted as a pastime as of old. The wild boar is still in existence in Austria, Germany, Westphalia, India and the South Sea Islands. There are wild hogs now in Florida, the descendants of those left there by the Spaniards three hundred years ago. The island of Bermuda was overrun with hogs, the proceeds of those left by old John Bermudaz when on his voyage to Cuba, and when the English discovered the island they found thousands there and of such value that the coin of the country bore on its face a wild hog. In Florida the hog when hunted and caught is held up by the ears and, if the rear end goes down, he is considered fit to kill, if not, he is allowed to go till fatter.

The estimated value of swine at one time in Great Britain alone was £20,000,000, and the number and value of the hogs in the United States is immense, the number for 1890 being 51,602,780, and the value $243,418,336, according to the statistics of the United States Department of Agriculture.

In Canada in the same year there were packed nearly 327,000 hogs, or 9,000 more than in the previous year, which at an average of 175 lb. dressed weight at 5¾ cents, amounts to $3,290,437.50. I may state here that the figures for the United States include 15,000,000 hogs which were estimated to have been killed in country places for local consumption, while for Canada there are no figures obtainable to correspond with these.

The Canadian grade hog, founded on the Berkshire, Essex, Yorkshire, Chester White, Poland China, Tamworth and other breeds, is a valuable animal and compares well with the hogs of any country. The system of feeding in this country is a vast improvement on that of any other, the animal being fed first on grass and clover, then on stubble, and then on grain in the pen. Owing to the increased population of our towns and cities, the lightened work of the farm on account of the use of improved agricultural machinery, etc., a change has taken place in the popular taste resulting in a demand for leaner, lighter and more palatable pork, so that now many farmers sell all their hogs and buy the better prepared meats from the packers. The hog crop of Canada is now almost entirely handled, cured and sold by the packers, and in the English market the Canadian product brings much higher prices than the hog product of any other part of this continent. But still there is not a sufficient number of hogs raised as they are always scarce

in summer time, when the trade in live hogs is at its best. The packing houses now employ men of skill to cut, cure and prepare the product for market, and a large amount of capital is required to engage in the business.

The Canadian hog is very free from disease ; we have but little disease in this country, and would have still less if proper care was given to the cleanliness and comfort of the animal. The hog is not a dirty creature if given the means to keep himself clean. There has been a great improvement of late years in the keeping of hogs at cheese factories. They are now fed more on grain than formerly and are kept in covered pens and regularly cleaned, being much more profitable to the feeder, and of more value to the packer in consequence. In some of our factories, however, the swine are still kept in filthy open yards, with no protection of any kind from the sun or rain, a nuisance to the whole neighborhood, and should be subject to the law regarding cruelty to animals.

Much has been written about the points and shape of the hog required by the trade. With regard to the carcass, while pure bred pigs are a necessity, I have always found grades from almost any breed to be suitable for my trade. We require, when dressed, a carcass weighing from 150 to 200 lb. at seven months old ; a long body ; thick, heavy ham ; small head and neck ; light shoulder, light in the bone ; deep and thick side, well marbled with fat and lean, and a fine shade of lean all through. I am not so particular as to color, but breeders should pay attention to the above points, so as to arrive as nearly as possible at a perfect hog for the packer's use at the present day.

All packers find that there is a certain percentage of pork which will not cure, and considerable loss is sustained thereby. This is accounted for by the sows not being spayed. This simple operation is strictly attended to in Great Britain and in other countries. The time will soon come that an unspayed sow, like a boar or stag, will be unsaleable. The loss from this neglect is larger from Canadian hogs than those of any other country.

In conclusion Mr. Fearman said : I would impress upon breeders and raisers of hogs that a change has come over the market with regard to fat pork. It is necessary that the fact should be fully understood that packers cannot afford to pay the high price for fat pork that was formerly paid, for the reason that it can be brought in much cheaper from the United States, owing to the different class of food available for hogs on the other side.

Mr. Brethour.—Do you prefer handling live or dressed hogs?

Mr. Fearman.—We prefer live ones ; one of the reasons for this being that our men handle them much better, and we thus secure a uniform profit.

SOME NEEDS OF THE SWINE INDUSTRY IN ONTARIO.

Professor Dean, Professor of Dairying at the Agricultural College, Guelph, was next called upon to read the following paper :

Mr. Dean said : As a preface to my remarks I may say that one of the chief difficulties which our farmers have to guard against is the exhaustion of the soil. In order to meet the constant drain upon it, it is very desirable that farmers should engage more extensively in the raising of live-stock and in dairy husbandry. There is no branch of the live-stock industry that will afford better returns than hog-raising. Tnere is plenty of scope for the growth of the industry for we import large quantities of hogs and hog-products at the present time.

From Bulletin xxx of the Bureau of Industries we would gather that more hogs and hog products than we at present produce are needed to supply the demand of our home markets and also that of the English markets. It would appear that for the years 1884 to 1888 inclusive there was an annual average deficit of $1,881,920 worth of hogs and hog products, or of $2,167,800 with the duty added.

Doubtless the conditions are much the same now as they were then. Could the farmers of Ontario engage in anything which would bring in annually about $2,000,000 to be distributed among them at less risk and cost? It is doubtful if they could.

Of the answers to the query as to which branch of farm stock pays best, about sixty per cent. of the replies sent in to the Department of Agriculture state "That pigs are more profitable than any other farm stock."

What then prevents farmers entering more largely into hog raising? Is it for lack of means to increase the number of pigs? No, because there is no domestic animal so prolific and that can be multiplied so rapidly as can the pig. Is it fear of disease? No; because we have very little disease among our swine, which is a point wherein our farmers have a great advantage over those in the western states. Is it for lack of enterprise? Hardly, as our Ontario farmers as a class are as enterprising and energetic as those of any other country. What then is the difficulty? In my humble opinion there are two chief difficulties in the way: First, the need for cheaper food and a proper use and care of the foods already at the disposal of most feeders. The reason for the need of cheaper food I find on page 41 of the bulletin already referred to: "The general opinion is that the Ontario hog-raiser can never compete on equal terms against the cheap pig feed of the western states." The second great need is: Hogs better suited to the requirements of the market. That we have not such may be inferred from the remarks of a leading firm of packers in the province: "Our experience is that the various breeds of swine in Ontario are all too fat, except perhaps the improved Yorkshire."

To meet the first need it may be necessary in summer time to treat the hog more generally as a *grazing animal* than has hitherto been the practice among Ontario farmers. While on a visit last summer to the Michigan Agricultural College I found their permanent pens nearly all deserted. The hogs were in small fields or lots, each being supplied with a low portable pen, the feed, principally drink, being put into troughs situated near their quarters. That some Ontario farmers practice grazing their hogs is seen by the following: A man from Kent says: "With a portable fence three acres of clover will be sufficient for twenty-five hogs. I also feed oatmeal, shorts and skimmed milk."

A Norfolk farmer says: "I think clover is the best green food for pigs. Ten good-sized hogs can be kept on one acre. Additional feed of whole, dry corn gives good results." Wm. Gerrie, of Oxford, writes: "I have found hogs do best on clover and whey mixed with shorts or slops. Skim-milk of course would be better, but our milk goes to the factory. If nothing is given but water twenty-five hogs ought to have at least five acres of clover, but with a little chopped stuff in whey slop, one-half of that would be sufficient."

Why might not a succession of green crops be grown for hogs which they could *harvest for themselves*? Say we commenced with clover, followed by peas, vetches and oats. These green crops, together with slops from the house, whey or skim-milk, or even water, would produce satisfactory gains. If the hogs were of the right age when started on these crops, by the time they had the peas and oats harvested they would be ready for market, and that too at the very best time at which to get the top price, viz., the month of August. What a saving of labor this would be! Why should we labor to harvest and thresh a crop that the hog can harvest and thresh as well as we? By this method we shall also have an animal that is more likely to suit the market than a highly fed pen animal.

A food that is deserving of the hog feeders' attention at the present time, owing to difficulties in obtaining a remunerative market price, is barley. Prof. Henry, in speaking of this grain, says: "We strongly urge upon our farmers to throw away all prejudice against barley for feeding hogs and other stock. If those who raise this grain will do so and study how to feed it to get the best results, they would be less at the mercy of grain buyers who, no doubt, prefer to have the idea continue that barley is poison to hogs—a belief without the least foundation." He reports that

471 lb.	barley-meal produced	100 lb.	gain.
435 "	corn-meal "	100 "	

"This shows that it required 36 lb. or about 8 per cent. more barley-meal than corn-meal to produce 100 lb. of gain."

When fed with skim milk

330	lb. of barley-meal and	398	lb.	skim milk	100	lb.	gain.
306	" corn-meal	371	"	"	100	"	"

In other words it required 24 lb. more of barley-meal, 27 lb. more of skim-milk to produce 100 lb. gain in the animals than it did of corn-meal and skim-milk.

If Prof. Henry's experiments should prove to give the same results in Ontario we should be able to save something like the following in the cost of pork production :

108	lb. barley-meal equals 100 lb. corn-meal.	
100	" corn-meal costs in Ontario about	$1 25
108	" barley-meal " " (at present time) about.....	1 08

At the prices given and at the amounts of grain required to produce 100 lb. of gain it would cost to produce this gain, on corn-meal and water, $5.43 ; and on barley-meal $5.08, or a saving of 35 cents per 100 by feeding barley-meal as compared with corn-meal.

Skim-milk and whey also have a higher feeding value if fed *sweet* than many are aware of. In regard to the feeding value of whey, allow me to again quote from the same authority :

" It was found when using whey as a partial substitute for grain that 760 lb. of whey effected a saving of 100 lb. of the corn meal and shorts mixture. Using these figures, if corn meal and shorts are valued at $12 per ton, then whey is worth 8 cents per 100 lb. ; at $15 per ton for the corn meal and shorts whey would be worth 10 cents per hundred weight."

This value, it must be remembered, was obtained by feeding *sweet whey* in every case —not the ordinary sour stuff obtained from a whey tank that has not been cleaned out since it was built.

The second need that I pointed out was that of a hog better adapted to the wants of the market. We recognise the fact that there are already a number of breeds in Ontario, but is there any one of them that " exactly fills the bill ?" Man has been the originator of all the breeds. A certain writer has truly said : " The pig is what the breeder and feeder make it." What man has done man can do again, and if man has originated the many breeds which we have at the present time, and, further, if none of these are exactly what we require for our purposes, is it not possible for Ontario breeders to originate a breed that will do what we require of it—or at least come more nearly to the ideal than any breed we have at present ? The Americans point with pride to their Poland China as an example of what American skill in breeding has done. (They also claim to have originated a breed of cattle). Prof. Roberts, in speaking of the American breed of hogs at a recent meeting in Ontario, said they were the best breed of hogs on the continent, and that it was a reproach to Canadians and Americans that we had to import annually a large number of pure bred animals to keep up our flocks and herds when we were capable of producing better breeds for our purposes than that come across the ocean. What then do we require in the hog for Ontario ? Improved constitution, increased prolificacy, less head, stronger bone, longer side and more ham, and the red and white meat well mixed. How shall we obtain it ? By breeding and feeding for it.

In reference to the art of breeding allow me to quote from Long's " Book of the Pig," wherein Sir John Sebright, a noted breeder of stock, is quoted as saying : " Were I to define what is called the art of breeding, I should say that it consisted in the selection of males and females intended to breed together, in reference to both their merits and defects. It is not always by putting the best male to the best female that the best produce will be obtained, for should they both have a tendency to the same defect, although in ever so slight a degree, it will generally preponderate so much in the produce as to render it of but little value." So then we might learn that the maxim " Breed the best to the best," requires certain qualifications ; we must keep an eye open to see that both have not the same defects in any marked degree.

The practice of breeding for the show-ring is no doubt responsible for a great deal of the tendency in pure bred animals for unprolificacy, the result being too much fat and

lack of side, bone and muscle. To quote from an English author writing upon this subject: "We have no hesitation in stating that there are breeders who have had but one end in view—the obtaining of prizes—for which they have competed with animals which have not only been in-bred, but fatted in an unnatural manner, and which were, consequently, worthless to the purchaser, either for the improvement of stock or the perpetuation of their own species."

In all breeding, whether for the dairy, the hog market, or any other purpose, particular attention must be paid to the sire used, because the sire is half the herd. This is especially important when breeding from grade females for any purpose whatever. The need for using pure bred sires only is tersely put by a writer in the following manner:

Dam, Mongrel, Sire, Full blood, } =Half blood, Sire, Full blood, } =Three-quarter blood, Sire, Full blood, } =Seven-eighths blood.

Dam, Full blood, Sire, Mongrel, } =Half blood, Sire, Mongrel, } = Mongrel ?

Having pointed out one part of the method of obtaining the desired animal, viz., by breeding, I wish to draw your attention very briefly to the subject of feeding. Breeding and feeding must go hand-in-hand to accomplish any marked improvement in live stock. There are three great classes of foods: (1) Boné producing, (2) heat and fat producing, and (3) muscle forming foods. The tendency in the past has been to feed hogs too largely upon heat and fat producing foods without due reference to the other two kinds. It has been found that by feeding bone-forming material, such as ashes, ground bone, etc., a great saving of food (28 per cent. of the corn required to produce 100 lb. gain) was accomplished while the animals so fed had much stronger bones. It has also been found that by feeding young pigs a liberal allowance of flesh-forming food, such as middlings, etc., their carcasses are greatly influenced in the right direction; they will have "a larger proportion of lean meat or muscle to fat; larger and stronger bones; more blood and larger livers; and they will grow more rapidly, making a more economical gain for food consumed" than will hogs fed largely on heat and fat-producing foods, such as corn.

In conclusion, I would mention a few needs that have not been touched upon:

We require to make a closer study of the best time to market and of the methods of marketing; we need more accurate knowledge of the cost of producing pork, and also to know that pigs in early life give the best returns in gain for food consumed. When we have gained the requisite knowledge on these points we may look for larger profits in the breeding and feeding of hogs and not till then.

In conclusion Mr. Dean said: Several points were brought out at the recent dairymen's convention respecting whey as a food for swine. The first was that the whey tanks should be cleaned out at least once a week; and the second, that whey should be heated to a temperature of at least 160° or 170°. Whey consists chiefly of water, but it also contains some nitrogenous or muscle-forming matter as well as the sugar which was originally in the milk. Whey has therefore a feeding value when fresh, but as soon as it sours it becomes useless for food. I may say that whey sours for the same reason that milk sours—because by contact with the atmosphere some of the sugar of milk is changed into lactic acid. If the whey is heated up to the temperature mentioned, the germs then present are destroyed, and in this way it may be kept from souring for a couple of days or more. This may easily be accomplished in cheese factories by turning steam into the whey tanks.

DISEASES OF SWINE.

Mr. W. Cowan, V.S., Galt, Ont., was next called upon and addressed the meeting as follows:

Mr. President and Gentlemen.—I am not going to try to discuss the whole of the diseases of swine, as that would take up too much of the time of the meeting. I quite agreed with Mr. Fearman when he said in the paper he has just read, that in this country

we are comparatively free from disease so far as swine are concerned; and further, I entirely agreed with him when he said that we would have still fewer diseases if only proper care were taken in the feeding and management of these animals.

I must confess that the diseases of swine are not yet as well defined as we would wish, but progress is being rapidly made in this regard, and before long we hope to have them as accurately defined as the diseases peculiar to other farm animals.

I shall simply confine my remarks to two heads, first, diathetic diseases, and second, infectious diseases.

Speaking generally, diathetic diseases may be said to be a morbid condition of the animal tissue, caused by a superabundance of feed, or by food of an unsuitable or unwholesome kind. In a great many instances, hogs are simply kept as scavengers of the farm. While I suppose that this is necessary to a limited extent to make up for a certain amount of waste, yet it must be borne in mind by our farmers that, if hog-raising is to be made profitable it cannot be done by maintaining the animal simply in that capacity.

I was going to talk a little along the line of feeding, but this ground has already been well covered in the preceding paper. I would simply say that, if we are to maintain the high position which our pork now holds in competition with our American neighbors, it is absolutely necessary that we should not only pay attention to the question of what variety of swine we shall raise, but also to the kind of food and treatment they shall receive. If we feed the animal on a food which is all fat and heat producing, and expect him to make pork with fat and lean mixed, and to remain in a healthy condition free from disease, we are expecting altogether too much from the animal system.

With reference to a few of the diathetic diseases of swine, we have a somewhat prevalent disease in this conntry which I consider to be the direct result of feeding city swill to pigs. I do not say that swill is not a profitable and wholesome food for swine; the trouble is that it is too often fed in a totally unfit condition. Very frequently it is cast into open tanks exposed to the atmosphere and to the heat in summer. If the swine do not consume it all at the time, the remainder is served to them again. There is no reason for throwing such food away, however, but if swill is fed to swine, the best plan is to feed it cooked or mixed with mill feed of some kind. It costs very little to do this, and when it is cooked by means of steam, or even in a kettle, it becomes a capital food. We have come across several instances in this country where the owners of the affected animals insisted that the disease was hog-cholera, but in tracing it out we found that it was due to the condition in which this food had been supplied to the animals. In such instances we recommended the boiling of the swill, aud always with satisfactory results. In our experience we have never had any injurious results from feeding cooked swill, even when scarcely any other food was given. I have occasionally been able to trace cases of sickness in swine to the excess of salt which swill sometimes contains. Too much salt is very injurious to swine and will kill them in large numbers.

In a great many instances, where it is customary to feed city swill, slaughter-house offal is fed in addition. This food, in the condition in which it is usually fed, I consider to be almost as bad as slow poison to swine, and very serious trouble may be the result if it is fed in any considerable quantity.

Another of the diathetic diseases to which swine are subject is paralysis. The disease is especially caused by feeding very concentrated foods, such as the different kinds of meal, in too large quantities. In feeding such foods it is necessary that they should be mixed with others of greater bulk. This will prevent them from forming an indigestible mass in the hog's stomach, and enable the digestive fluids to act upon them more readily.

Paralysis in swine is a disease which is only partially understood, and I cannot give you the pathology of it, but would simply say that it is believed to be caused by a reflex action from the stomach to the nerve centres. Some attribute it to a parasite in the kidneys, but our experience leads us to believe that it is caused by the action of the stomach on the nervous system, as I have suggested. Prevention in such cases is much better than cure. Let the feed ration be so composed that the stomach of the animal is able to digest it, and do not feed in such quantities that the system cannot accommodate itself to the amount consumed.

Congestion of the brain is also a disease to which swine are liable. This disease is sometimes considered to be contagious, because it usually occurs where there are a number of swine together, and because probably one-third or one-half of them will be attacked in about twenty-four hours. I remember a case in point where forty were attacked in one night. Next morning twenty were dead, and in another twenty-four hours the loss was about forty. The owner was certain that he had some contagious disease among his swine. In investigating the circumstances, however, I found that the feed he was giving them consisted of meal and middlings. He was engaged in the milling business and fed his hogs on the refuse from the oat-meal, together with middlings and a certain amount of frozen wheat. The only bulky food that he was giving them was the screenings from the oats, which, on analysis, we found to have practically no feeding value whatever. It was a little difficult to discover precisely the action of that food upon the brain, but we learned upon enquiry that it was customary for him to steam this ration about once a week, and that it was then left to ferment for the remainder of the week. The swine would get it sweet for one day, but by the next more or less fermentation had taken place, which continued to increase each successive day for five or six days. I believe that in this case congestion of the brain was caused by a certain amount of alcoholic fermentation of the food consumed, and from the concentrated nature of that food. We changed the food entirely and added a certain amount of pulped roots to the ration, and I don't believe that he lost another animal. This was an instance of feeding a highly concentrated food in a shape totally unfit for the stomach to assimilate.

During the past season we met with quite a number of cases of what may be designated parasitic pneumonia. This disease is the result of a parasite called the *strongylus paradoxus* which is usually found in the lower portion of the large lobes of the lungs and bronchial tubes. Its presence is usually indicated by a congested rather than an inflamed state of that organ, and, in fact, might not be noticed unless a careful examination were made. The parasites grow in cists about the size of a small pea, and by cutting into the affected portion of the lung they may easily be discovered and examined.

I think that during the past season this disease has probably cut off as many swine in Ontario as hog cholera has. With regard to its symptoms, I may say that they are very similar to hog cholera. The affected animal has the same emaciated appearance, although not the spotted skin nor ulceration of the bowels, which is frequently present in cases of cholera. A hard and violent cough is another symptom, the coughing sometimes lasting for three or four minutes at a time. The same disposition is manifested as in hog cholera to lie hidden away in the litter. They may feel well for a time, but as a general rule, when the cough appears, the appetite becomes impaired.

One of the most destructive diseases in this country and in all countries where swine are kept is hog cholera. I am happy to be able to say, however, that no country is freer from it than the Dominion of Canada. This is known to be a contagious disease in every sense of the word. The germ of this disease will travel further in the air than almost any other known germ. It also seems to have an inclination to travel with a water-course.

The symptoms of hog cholera are not entirely characteristic owing to the fact that there are two recognised forms of the disease. Although in certain cases the symptoms may be so well defined that the disease is easily determined, in the majority of cases it is better to enquire into all the circumstances and to hold a post-mortem on an animal killed for that purpose. In fact we are never safe in asserting that a disease is hog cholera unless we can with some certainty trace it to its source. Infection is, of course, the source of the disease, and if we can discover that source and remove it the effect will not follow.

The first and principal cause of the spread of this disease is the transportation of swine from one district to another. There is far more danger of communicating the disease by bringing sows from an affected district than there is in bringing boars. For instance, should a sow that has become pregnant during an outbreak of hog cholera and has been subject to infection—although she may not have actually had the disease—be sold into another district shortly before she farrows, there is a possibility that the young pigs when born may develop the disease and communicate it to the whole herd. We have known of such instances as this.

We also find that streams and water-courses are very liable to carry infection. This explains the reason why several outbreaks are frequently found at intervals along the banks of the same stream. I cannot speak authoritatively as to the manner in which the disease is thus transmitted, but I imagine that the germ is carried along by the current until it effects a lodgement on the mud at the bank ; or it may be left on the grass by the stream at seasons of overflowing.

Persons cannot be too careful when going around among cases of hog cholera not to carry the germs of the disease away on their clothing, implements, etc. We have known cases where the disease has been transmitted from one place to another by such means.

The symptoms of swine fever are that the affected animal runs at the eyes ; the ears lop over ; in warm weather especially the ears become raw, and this soreness will frequently extend over the back ; a strong desire is shown to lie hidden in a corner with the head under the litter ; there is also some coughing, but it is not distressing in any way. An affected animal may last from twenty-four hours to from three to four weeks after the first appearance of the disease. If diarrhœa is present it takes the form of a fetid, black, watery discharge.

Post-mortem examinations have led us to believe that two forms of the disease exist, as has already been stated, one affecting the lungs and the other the bowels. In cases where the lungs become the seat of the disease, we usually find that those organs are not inflamed as in ordinary inflammation of the lungs, but that little black spots appear, varying in size from a pea to a marble. These spots run together as the disease progresses. In cases where the bowels are chiefly affected you always find ulcers in the cœcum, and there is also a certain amount of inflammation present.

We must acknowledge that there is no treatment for this disease. All that can be done is to take every precaution to prevent its spread by means of isolation and by destroying the affected animals. We occasionally meet with persons going through the country selling so-called remedies for hog cholera, but such are entirely worthless. The only remedy is to stamp out the disease. It is not always necessary to kill the entire herd in order to do this ; I think it is better sometimes to take chances. Completely isolate the healthy from the affected. The carcasses should in all cases be either burned or buried immediately. If they are left above ground carrion birds are apt to eat of them, and the germ, passing through the bodies of the birds, may be dropped to the pasture and thus affect the swine grazing thereon.

SWINE RECORDS.

Mr. Brethour.—I do not consider that the records are in a satisfactory condition at present so far as our breeders are concerned. We have no herd book, and nothing has yet been done to remedy the defect. I would suggest that a committee be appointed to draft whatever resolutions they may deem advisable in this regard. We should have a herd book out almost immediately, because it would have more or less effect upon our Columbian exhibit. I think that it is desirable to appoint a committee because there are many points which will need to be gone into thoroughly.

Messrs. Brethour, DeCourcey, Harding and Snell were accordingly nominated as a committee to consider the matter and report their conclusions to the executive.

THE REGISTRATION STANDARD.

Mr. F. Green, jr.—Would it not be well for the Association to discuss the standard of registration ?

Mr. Snell.—I suppose that the standard will be to trace to imported ancestry. I do not think it would be well to require that all animals eligible for registration shall trace to imported ancestors recorded in England or elsewhere. If they are able to trace to imported animals of a well known herd of pure bred stock, that is all that should be asked.

Mr. Brethour.—I think that there have been animals imported into this country which could not be furnished with a pedigree at all. Lots of unrecorded animals have been brought over, and it would not do to allow such to pass as pure bred.

Mr. Simmons.—I think that if the imported ancestry of an animal is not recorded in an English herd book the animal should not be eligible for registration here. If we adopt any other course our stock will never be eligible to compete with American stock, and we want to form our standard so that we can compete with our neighbors. To my mind this is a matter which will hardly be settled to-night. Owing to the lateness of the hour and the fact that many of our members have already left, we cannot give it the consideration which it requires. My opinion is that the executive should thoroughly consider the matter and hold a meeting with Mr. Wade. Just as the foundation is so the structure will be.

Mr. Brethour.—But if we keep on deferring this matter it may remain unsettled for an indefinite period.

Mr. Simmons.—The executive may be called together at any time.

Mr. Brethour.—Then it would be well for the Association to empower the executive to formulate a standard.

Mr. Hodson.—I think that our standard should be as high if not higher than the American standard. We might, however, take their standard as a basis to work upon.

It was accordingly moved by Mr. Brethour, and seconded by Mr. Harding, That the Executive Committee be instructed to meet with Mr. Wade and with him formulate a standard for the registration of swine, said standard to be equal in its requirements to any recognised American or English record that now exists. Further, that the Executive Committee of this Association shall confer with the Secretary of the Agriculture and Arts Association, say between the 1st and 15th of June and 1st and 25th of December of each year, the exact date to be named by the Recording Secretary, Mr. Henry Wade, to decide upon the pedigrees submitted for registration. That no pedigrees be published in the records that have not been examined and passed by the editing committee and duly initialed by the chairman thereof. That the editing committee be responsible for all pedigrees published in the record. That each volume shall contain all pedigrees received up to the 20th day of December of each year, and that the record be issued not later than the 1st of March ensuing. That, as soon as a volume of the record is issued each year, the Treasurer pay to the Agriculture and Arts Association the sum of one dollar for each member of this Association, for which sum the Agriculture and Arts Association shall send post paid to every member a copy of the year's record. That, owing to the fact that the pedigrees which have already accumulated are so numerous that they cannot be published in one volume for the sum provided, our Treasurer be instructed to pay to the Agriculture and Arts Association the sum of two dollars per member as soon as the complete volume is issued and in the hands of our members, provided that it be not later than 6th April, 1893.

That the Secretary be instructed to furnish the Recording Secretary with the names and addresses of the Executive Committee of this Association each year within ten days after the annual meeting; further, that he be instructed to issue to each member of this Association a certificate of membership for the current year entitling the holder thereof to the privileges of membership, said privileges to be specified thereon That a copy of the above resolution, also the one passed at our last meeting establishing the record, be transmitted to Mr. Henry Wade by our Secretary for his information and guidance. Carried.

EAR-TAGS FOR SWINE.

Mr. A. Brown, Bethel.—In view of the large increase in the number of pure bred swine, I think it very desirable that some means of identifying them should be instituted by this Association; I would suggest ear-tags for the purpose, similar to those used for sheep, with the Association number stamped thereon,

The resolution was put to the meeting but declared lost by one vote.

RULES GOVERNING THE CANADIAN SWINE RECORDS.

The Directors of the Dominon Swine Breeders' Association convened March 10th in the office of the Agriculture and Arts Association, Toronto. The following rules were accepted and will govern the entries received for registry in the various divisions of the Canadian Swine Record:

Berkshires.

1. Animals to be eligible for entry must have been bred by reputable breeders in Great Britain, or satisfactory evidence given that they are directly descended from such animals with every cross recorded.

2. All animals imported after April 1st, 1892, must be registered in the British Berkshire Record, or the dam and sire must be recorded therein.

3. An animal recorded in the American Berkshire Record shall be eligible to record in the Canadian Berkshire Record.

4. Boars and sows may be entered at any age.

5. The date of birth of each animal must be given correctly, and the name and address of the breeder and owner.

6. When forwarding the pedigree of an animal to be recorded, give the number of pigs in the litter to which it belongs.

7. The owner of a sow at the time she was served will be considered the breeder of the pigs.

8. No pedigree will be received unless written on the printed forms furnished by the Recording Secretary, and must be certified to by the breeder and owner or agent or representative of each.

9. All applications for the registry of pigs sired by boars not the property of the breeder must be accompanied by certificate giving the date of service, name and number of boar, signed by the owner of the boar, whose full address must be given.

10. All registered animals when sold must be transferred on the books of the Association before their progeny is eligible to register. If a female is pregnant when sold, the seller must give the name and number of the boar by which she was served.

11. Transfers sent in during the year shall be published in the first succeeding volume of the Record.

12. Entries must be accompanied by the necessary fees, as follows: Members of the Dominion Swine Breeders' Association will be charged for the registration and certificate, fifty cents each, transfers twenty-five; non-members, double fees.

Rules Governing the Suffolk Record.

1. Animals to be eligible for entry must have been bred by reputable breeders in Great Britain, or satisfactory evidence given that they are directly descended from such animals with every cross recorded.

2. All animals imported after April 1st, 1892, must be registered in the Middle or Small White Sections of the National Pig Register of Great Britain, or the dam and sire must be recorded therein.

Rules 3 to 11, inclusive, are the same as are from 4 to 12, inclusive, in the Berkshire Division.

Rules Governing the Tamworth Division.

1. Animals to be eligible for entry must have been bred by reputable breeders in Great Britain, or satisfactory evidence given that they are directly descended from such animals, with every cross recorded.

2. All animals imported after April 1st, 1892, must be registered in a reputable British register, or the dam and sire must be recorded therein.

3 to 12, inclusive, the same as 4 to 12, inclusive, of the Berksire Record.

Rules Governing the Registry of Improved Large Yorkshires.

1. Animals must trace in all crosses to ancestors registered in the section for large white pigs in the English National Pig Register.

2 to 10, inclusive, the same as 4 to 12, inclusive, of the Berkshire Record.

RULES GOVERNING THE POLAND CHINA DIVISION.

I. Animals to be eligible for entry must trace in all crosses to United States Records for Poland Chinas in good standing.

Rules from 2 to 10, inclusive, the same as 4 to 12, inclusive, in the Berkshire Division.

The rules governing each of the Chester White, Jersey Red and Victoria Divisons are similiar to those governing the Poland China Division.

In each Division an animal whose dam and sire is recorded therein is eligible for entry in that Division.

Mr. Henry Wade, Toronto, Ont., is the Recording Secretary. He will furnish entry blanks, etc., free of charge, on application.

THE BROOD SOW AND HER LITTER.

BY S. COXWORTH, CLAREMONT, ONT.

The subject that I have chosen for this paper is of no mean importance, not only to the swine-breeder, but to the general farmer as well, for there is no animal on the farm from which we can derive so much profit, for the amount of money invested as from the brood sow.

The first point I would bring to your attention is the selection of a suitable animal for this purpose. Select the brood sow from a good even litter, choose one that is of a good medium length, well sprung in the rib, with deep sides, heavy hams, and with at least twelve teats, and as many more as possible. Observe that the teats are placed at equal distances from each other, and that they are not under-sized or false. The udder should commence as near as possible to the fore legs, for two reasons, first because it gives the little pigs more room when sucking, and, second, because we notice that the pigs sucking the forward teats thrive the best,—a sure evidence that these teats give a larger supply of milk of better quality than those at the hinder part of the udder.

There is considerable difference of opinion as to the age at which a sow should breed; some advocate that they should not be bred until they are at least twelve months old, claiming that otherwise their growth is checked, so that they do not make such fine sows as would otherwise be the case.

To a certain extent this may be true; and especially where they are intended for the show-ring, I would say, do not breed them until they are twelve or even fifteen months old. My experience is that if we feed our pigs liberally until they are eight months old and then mate them, they will make better mothers and better milkers; neither are they so clumsy nor so likely to overlie their little ones. Besides this, there is often difficulty in getting a sow to breed, which has been allowed to lead a lazy life until she is a year or fifteen months old. Always breed a young sow to an aged boar. After the sow has been bred she should be fed liberally on bone and muscle rather than on fat producing food, such as ground oats and barley with a liberal allowance of pulped roots (mangels preferred). As the time for farrowing approaches, I substitute bran for barley. In all cases give breeding sows plenty of exercise and a warm dry bed, a few days before farrowing; place her in a dry roomy pen with cut straw for bedding and with a protection around the sides to prevent her from lying on her litter. There is not the same danger of this with young sows, however, as with older animals, as the older they get the more clumsy and stupid they become. When the pigs are farrowed, give the sow no feed until she looks for it; then she should receive a little bran in water warm enough to take the chill off it. Never give the sow strong feed for at least a week or ten days after farrowing, for if you do the chances are that the result will be very detrimental to the young pigs; whereas, if the mother is fed upon lighter food, such as bran, her litter will almost invariably look sleek and smart. It is true that the sow will lose a little in flesh, but this can be easily remedied after the pigs are weaned. My plan is to feed nothing but soaked bran for a week after farrowing, then add ground oats and barley in small quantities, and, as the pigs grow, increase the feed for the sow.

When the young pigs are three days old, care should be taken that they have no tusks or black teeth as these often point inwards and cut the tongue while sucking, or else point outward and produce sores on the jaws and lips, often causing them so much pain when sucking that after a few days they will cease to suck altogether and pine away and die. These teeth should be broken off close to the jaw with a pair of small nippers. When the pigs are about three weeks old, partition off part of the pen, and place therein a small trough with a ration of new milk and ground oats. They will soon learn to eat this freely, and it is suprising how much it will help both the mother and her young. Far too often it is thought that a good mother can supply all the nourishment necessary for her litter at this age, but this is a mistake and unfortunately its effects are never fully realised until the pigs so treated have reached maturity. The difficult is this: the quantity of milk the little pigs get from their mother at each meal is very trifling; it is exceedingly rich and is taken frequently; if this goes on for six or eight weeks, and no more bulky food is given, their whole system settles down to a state of things which cannot last, with the result that when they have suddenly to rely on food of perhaps ten times the bulk, they have not the capacity with three meals a day, to stow away sufficient to carry them on in good condition. Sometimes pigs reared in this way will eat and drink and will be to all appearances healthy and saleable, but the chances are that, owing to the severity of the strain to which they have been subjected, many of them will be unthrifty or else have some weak points about them. This form of weaning is always going on to a certain extent, and the after effects are often attributed to other causes. It perhaps happens oftener through oversight than from any other reason, but it is well that attention should be directed to the importance of this matter. My plan is to let them suckle until they are eight weeks old; they are then strong and thrifty—weighing say from 40 to 50 lb. each—and are ready to go out and do well for themselves.

SWINE FOR EXHIBITION.

By Daniel DeCourcey, Bornholm, Ont.

Mr. President and Gentlemen—As you are aware, we are now entering upon the third year since the formation of the Dominion Swine Breeders' Association. All associations such as ours are organised with a view to accomplishing some practical purpose. I think we may claim that our Association has made commendable effort during the past year in that direction, first, by sending delegates to the principal fair boards in this province to explain to them our requirements. These gentlemen were very willing to meet our delegates and to comply as far as possible with the wishes of this Association in regard to the premiums offered for swine at our fairs. They also agreed to our suggestion in reference to the single judge system, which we consider far superior to the old plan of having three judges. We must not think, however, that we have everything perfect; there is room for much improvement yet. The hog is one of the prime factors of our food supply, and we ought constantly to endeavor to improve that product. Much has already been done towards this end by the judicious offering of premiums for swine, and we might well recommend greater liberality in the swine department on the part of our various exhibition associations; it would give the necessary encouragement to our breeders to fit their stock for the show-ring. I think that by all means swine should rank as high as regards prizes as do sheep, but under existing circumstances, the exhibitor of swine gets a smaller return for his trouble and expense than do exhibitors in any other department of live-stock.

With regard to judging swine, I would urge the necessity for judging an animal according to its actual merits upon exhibition day and not with a view to how it may develop in the future.

We should upon no account fail to bear in mind the World's Columbian Exposition of 1893. We must neither lose time nor spare pains to fit our swine for that great contest. If we fail not in this, we shall doubtless be able to secure for Ontario and for the Dominion a fair share of the laurels on that occasion, and at the same time make the merits of Canadian bred stock apparent to our American neighbors.

As a word of advice to the furtherance of the interests of swine breeding, I would recommend that our breeders help one another in every possible way rather than endeavor unfairly to compete with and cut one another's business. Help your neighbor to make sales; do not take a likely purchaser away when he has obtained your neighbor's price and then sell him one of your own animals for a few dollars less. Let us make it our maxim in all our business transactions to do unto others as we would have them do unto us.

OUR SWINE INDUSTRY.

By J. E Brethour, Burford.

Pig breeding does not receive that attention which the importance of the subject demands at the hands of the farmers of Canada. I will venture to say that there is more money annually lost in the growth of pigs by thoughtlessness and improper feeding than any other class of domestic animal.

Our farmer thinks, that because his pigs (rather than starve) eat all kinds of waste rubbish, that is the way they delight to be kept; others again, argue, that money cannot be made by feeding pigs, as they eat too much grain; and upon enquiry I find that they feed nothing but a grain ration and usually, only one kind of grain, either corn or peas, which is frequently thrown in upon the floor of the pen, to be taken up by the pigs, mixed with filth and dirt, the accumulation of weeks. If one-half the grain ration were fed in conjunction with roots or vegetable food of some kind in winter, and green fodder in summer with comfortable pens, frequently cleaned out, and furnished with clean dry straw, the pigs would prove the most profitable stock upon the farm.

It is often said, that a pig eats more in proportion to its size, than a feeding steer, but it is not taken into consideration, that a small pig will put on as much flesh per day as a two or three year old steer, and only require a small proportion of the amount of feed, there being so much more waste in keeping up the larger carcass of the steer.

Another source of economy is growing pigs, is that they do not require as expensive buildings as most other kinds of stock, and less time is required in feeding and caring for them. I would not be understood as recommending farmers to give up breeding other stock in preference to pigs, but I would say,—keep more pigs—and give them better attention than they usually receive upon the farm, and the net returns will be greatly augmented.

The reputation which our Canadian pork has attained in the English market ought to stimulate us to produce a much greater quantity. Last year Great Britain imported over 560,000,000 pounds of pork, and of this amount, Canada sent only seven and a half million pounds against the United States 515,000,000 pounds.

When we take into consideration the fact that the Canadian pork realised one cent to one cent and a half more per pound than the American article, we certainly ought to take advantage of our position.

We are also importing annually from the United States, over ten million pounds of pork, all of which might be profitably produced in Canada. Our market is practically unlimited, if we produce the class of pork which the market demands, viz: hogs weighing from 160 pounds to 200 pounds, and possessing a large proportion of lean meat. The subject of leaner pork, has been repeatedly brought to our notice by all the principal pork-packers of our country, and it is to our interest, as breeders to endeavor to produce an article as near the requirements of the trade as possible.

I would here make a strong protest against the class of pigs usually seen in our show-rings; they have short turned up noses, heavy jowls, full crests, heavy shoulders, and broad flat backs. If they were converted into marketable products, one half would be grease which would sell at a very low price, and the balance only a medium quality of pork. An excess of grease is quite as much offal as an excess of bone.

This form of animal is very different to the style of pig required by the trade, which should be light in the head, as little jowl as possible, neck and shoulders light, ribs well

sprung, giving good heart girth, the back should be well fleshed with a thick loin, sides deep, having a full flank, and hams well let down, and a body as long as possible with above conditions. A great deal may be done by a system of feeding to produce leaner meat, but more attention will have to be given to selection in breeding.

I am aware this is quite contrary to the common idea of a hog, for the reason that we have been following the fat line of breeding, rather than one with vigor and muscle in it.

It is often argued, in opposition to this style of pig, that there is no advantage in growing lean pork, as the buyers will not give any more for this class of hog than one overloaded with fat; but less mercenary spirit for the present, and more looking to the future, will enlarge the foundation of the pork business and will create a larger demand, which will improve the entire hog trade.

HOW SHALL THE PRODUCTION OF PORK BE MADE PROFITABLE?

By C. M. Simmons, Ivan, Ont.

The swine industry of Canada is not as profitable as is desirable for the breeders and producers of pork. At present prices, breeders or feeders of swine can hardly show a profit for food consumed unless they make dairying an adjunct to the business. It would require close figuring to show a profit were the feeding rations exclusively made up of grain. From a financial standpoint it appears to me that there are only three methods of feeding from which a profit may be expected for the food consumed :

(1) Keep no more hogs than will clean up the slops and coarse litter of the farm. (2) combine the business of hog-raising with that of dairying ; or (3) feed on a grain ration during the summer months only, allowing them the liberty of the clover field, orchard, etc. Finish your hogs at the age of six to nine months old ; it will never pay to feed swine longer at current prices for pork.

There has been a great deal written of late setting forth certain claims for the different breeds of swine, insisting that they are by nature or by breeding the ideal hog, or the hog which the popular taste demands. I am willing to admit that the farmer must as quickly as is consistent with economy shape his product to the popular demand ; but care must be taken to see that a change from bad to worse is not being made, and that you are not going from a profitable industry to one for which your location, conditions and surroundings are entirely unfitted. Farmers, at this time of low margins, should consider well the cost that a change brings about. If you have been producing pork at a profit from a certain breed or grade of swine, say at a cost of four cents per pound live weight, or at five to five and a half cents dressed, the question to be asked is whether it is to your advantage to substitute an entirely different type of animal, such as would not perhaps be considered a typical animal to assimilate food, to mature at an early age, and to produce pork at the figures named. The price paid for the popular product must under such circumstances be sufficient to compensate for the increased cost of production. Quality as a rule will command the highest price, as is the case with the prime products of cattle and sheep and of the dairy.

I had occasion to address a number of farmers in the county of Oxford very recently and took advantage of the opportunity to get their views, independent of my own prejudices regarding the various breeds of swine, etc., which are popular in that part of the country. Throughout the greater portion of the county of Oxford the dairy industry takes the lead, the swine industry being largely carried on in connection therewith. It is common to hear of $300 to $700 worth of pork being produced on one farm. As regards popularity, so far as I can judge, the breeds took the following order : (1) Berkshires, (2) Chester Whites, (3) Poland Chinas, (4) a cross of the first two named. I would suggest in conclusion that the experimental station, in connection with the Agricultural College, Guelph, make a fair test of the different breeds of swine to determine the cost of production of what is called the typical bacon hog, as for aught we know the bacon if one breed may cost from one half to two cents per pound more to produce than that of another.

THE CHESTER WHITE AS AN AGENT IN IMPROVING OUR COMMON STOCK.

By R. H. Harding, Thorndale, Ont.

Mr. President and Gentlemen.—I have endeavored at our secretary's request to prepare a short paper on the Chesters and the improvement of common stock. The first question which would naturally be asked is, why do you prefer Chester? The following are among the reasons I give for my preference. They are a white variety, therefore show a nicer carcass when dressed than any of the dark breeds; they are very quiet; they will make first class pork at from six to eight months old or will grow to a large size if fully matured; they are very hardy and they perhaps fill the demand for lean meat as nearly as any other breed with as large profits for the producer. With very few exceptions a pure bred Chester white boar will leave pure white pigs every time from sows of any color, and, further, it is asserted by prominent shippers, that they cross better on common stock than any other breed. Chester grades of the second cross have been killed in my neighborhood at eight months, weighing over 200 lb. dressed.

Quoting from "Harris on the Pig:" "There are several reasons why the Chesters are more popular than English breeds. In the first place they are a large hardy breed of good constitution, and the sows are good mothers." Mr. Thos Wood, of Pennsylvania, says: "The Chester White of to-day is a most desirable, well formed, easily fattened, and perhaps the best bacon hog for the general farmer in this or any other country." He also gives the result of his experience with the Chesters and Berkshires thus: "I procured from a noted breeder in a neighboring state, two Berkshire pigs about ten weeks old, and with them in a pen I put two Chesters from a litter of our own after several of the larger ones had been sold. They were a few days younger than the Berkshires, which were masters at the trough, and they remained so, knocking the Chesters about as though the whites had no rights that the blacks were bound to respect. After feeding the four together for eight months the Chesters weighed 75 lb. each heavier than the Berkshires." As to the Chesters being cholera proof, Thomas Miner, of Edinburgh, Indiana, U.S, states that all his hogs, 70 in number, were attacked with the cholera, and the only pig in the whole herd that recovered was a Chester sow, the only one he had. This I consider an unprejudiced testimonial in favor of Chesters. The fact that he had only one proves that he was not partial to this breed.

In raising pigs to sell as breeders I prefer to feed raw food, for the reason that probably nine out of every ten of my purchasers feed raw food. If an animal is accustomed to cooked food and during the two or three days' journey on the cars is placed upon a raw diet, the change is more than the digestive organs are prepared for; the result often being a stunted pig, a disgusted purchaser and an injured breeder.

The main object of raising pure bred pigs of any breed is to improve the common stock of our country and thus add largely to the profits of the hog raiser. If common sows are bred to a good pure bred boar, the stock obtained will be so improved that I believe it would be a better investment to pay $5 for the service of such an animal than to get the service of a mongrel free. The fact must be admitted that such boars have been used by some with but little or no benefit resulting. Some of the reasons are as follows: There are farmers in every neighborhood who half starve their breeding sows, some from a conviction that it improves their breeding and suckling qualities, and some because they think anything good enough for a pig. Ever since I kept pure bred boars I have noticed that those farmers who are good feeders always speak well of the cross, while those who are accustomed to starve their sows and let the little pigs find their own living, will say that pure bred boars leave no better stock than common boars. It ought to be sufficient to say that as pigs are raised for profit and not for pleasure, there is no sense in keeping them until they are twelve months old to make them weigh what they should weigh at six months; nor can a sow be expected to raise thrifty litters if she be not kept in a thrifty condition herself.

MISTAKES IN THE BREEDING AND MANAGEMENT OF SWINE.

By J. C. Snell, Edmonton, Ont.

The farmer's principal object in breeding and raising swine is, without doubt, a monetary one He must, therefore, consider first of all what line of breeding and management will give him the best return for his time, his labor, for the money invested and for the feed he gives his stock. The wise farmer will not turn a deaf ear to the advice and counsel of the butcher, the drover, the packer, the dealer and the consumer of his products. He will patiently and courteously hear them all, and will give careful consideration to all their opinions, suggestions and advice ; but at the same time he must endeavor to be his own judge and to understand what is to his advantage and what is not ; he cannot accept and act upon the advice of everyone who is willing to offer it. In reply to those who had been trying to persuade the Manufacturer's Association at their late annual meeting that protection was not in their best interests, the president said: "Gentlemen, we think we know what is best for ourselves." That too must be the aim and object of every farmer. The only regret I have is that the farmer does not express his views quite so boldly or so confidently as the manufacturer does. There is no good reason why he should not be equally as decided in his opinion, as confident in the expression of it, and as firm in carrying out his convictions as the manufacturer. A few years ago the Miller's Association of this province issued a mandate against the production of a variety of winter wheat, known as Clawson or Seneca, which was then being introduced, declaring that it was an inferior flouring wheat and would have to be sold at a reduced price ; but as it gave good yields. was a fine looking sample of grain, was midge proof, and not liable to rust, the farmers thought they knew what was best for themselves and they acted on that conviction, with the result that the Clawson wheat brought as good a price as any on the market. The buyers used it to grade up inferior samples ; all made money by it and there were no more complaints. A few years later a cry went out from the millers against what is known as "Goose" spring wheat ; it was no good for flour, or at least good flour could not be made from it they claimed, and farmers were advised not to grow it. But other varieties of spring wheat were very uncertain at that time, and were liable to be affected in many ways, whereas the Goose wheat was always a reliable crop. In this instance the farmers again presumed to exercise their own judgment ; they continued to grow Goose wheat ; the price kept getting a little better every year, until eventually there was a demand for that particular brand of flour, and last year the secretary of the Millers' Association of Ontario actually issued a circular letter addressed to the farmers advising them to grow Goose wheat instead of barley, as there was an established market for it, and informing them where seed could be obtained.

I cite these as examples of the wisdom of the bulk of the farmers in not allowing others to lead them by the nose, or to compel them to blindly follow the advice of any party, or to accept any theory no matter how plausibly it may be put. I have no doubt but that there were some timid men among the farmers who took the advice of the millers against their own judgment, but they were the men who "got left."

This reminds us of the losses which individual farmers all over the country have sustained from time to time, by being pursuaded to invest in some new discovery which appealed to their cupidity, and led them into serious loss and shame. I would not be understood as classing the millers and the pork-packers with the fraudulent seed-grain and live-hedge operators ; I am willing to believe the former are sincere and honest in their desire to introduce what they think will serve both their own and the farmers' interests ; but events have proved that these men are not infallible and are liable to make mistakes. What I do claim is that farmers should be very careful about taking up any new idea until its advantages have been fully demonstrated. I am not opposed to experimenting ; I am fully persuaded that many of the best things we have in agriculture have come to us through this medium ; but I think we should move cautiously in taking up new things, and rather hold fast to that which we know to be good until we are sure that we are offered something better.

The farmers of Canada have made distinct advances in the matter of improving the

swine of the country. I believe I am correct in saying that our swine show more general improvement than perhaps any other class of live stock in this province, and greater improvement on the average than do the swine of the United States. The prices for pure bred animals have not been above what the average farmer could afford to pay, and the majority have availed themselves of the use of improved stock. The result is that we have throughout the country a comparatively uniform class of swine, well suited to our requirements. The average animal is of a quiet and contented disposition, well adapted to grazing and thus seeking and finding a large part of his living during the summer months in the pasture fields and in the grain fields after the harvest. By such means muscle and lean meat is developed in satisfactory proportions, and the animal is kept in a healthy condition, fattening rapidly when in the feeding pens and giving good returns for the food consumed. On the other hand, if it be desired, they are also suitable for feeding from birth on high pressure principles to go to market at an early age. They may be made to weigh heavily at an early age and to produce as good a class of meat as any breed could be expected to do fed on this principle.

The prevailing breeds of the great corn growing and hog producing states of the American union are very similar to our own, although a comparison would be largely in our favor. Of the hogs marketed at Chicago, the "Hogopolis" of the earth, where, for the week ending Saturday, January 16th last, the number of hogs marketed at the Union stock yards reached the enormous total of 267,545, I believe I am safe in saying that over 90 per cent. are black and white, being either Berkshires or Poland Chinas or crosses of these two breeds. The price of pork at Chicago, as at Toronto and other places in Canada, is regulated by the Liverpool and other European markets. For many years I have been a regular reader of the Chicago market and live stock reports, and I have failed to notice any complaints on the part of the buyers and packers at that point as to the suitability of the hogs offered for the markets which they supply in common with our own packers. Now, in view of these facts, it does seem strange that a solitary packer in this country should raise the cry in the press that Canadian hogs are unsuitable for the markets; that they are too much disposed to produce an excess of fat, and that the proper thing for us to do is to cross our hogs with those of some so-called *improved breed*, and thus secure, it is claimed, the desired type.

The experienced breeder knows that the only safe method for the average farmer to attempt is to cross pure bred males upon common or cross bred females. By continuing this process a desired type may in time be secured and fixed; but for the average farmer or breeder to cross pure bred males on pure bred females of different and distinct breeds is pure folly. It is true that in rare cases new and distinct breeds have been established by master breeders by crossing and recrossing the existing pure breeds and by in-breeding, accompanied by rigid selection, but the idea of pork-packers undertaking to teach the farmers and breeders of this country how to breed their hogs is a little too absurd. If the standard breeds are found to be deficient in any desirable quality, I am confident that the defect may be remedied without crossing, without going outside of the breed simply by a selection of the fittest, or those most nearly approaching the desired type. In this way uniformity may be attained and retained, but by crossing you secure anything but uniformity.

When a new fangled idea is introduced with a flourish of trumpets, it is sure to catch some one who is spoiling for a trial of something new, and this latest fad has been worked for all it is worth. The interested owners have used every means available to boom it; the weights have been put up high, the length stretched, and all the claims of the new departure even to the 16 and 20 pigs at a litter have been trumpeted with all the enthusiasm of the side show man who in proclaiming the wonderful fecundity of his "whang-doodle," solemnly declared she was "double-breasted and had four rows of teats." A number of farmers in different sections of the country have been induced to try the experiment of introducing the new breed of hogs with disappointment and dissatisfaction at the result, as might have been anticipated, finding them slow feeders and deficient in constitutional vigor.

One of the most fatal mistakes in breeding hogs or any other class of stock is to overlook the question of constitutional vigor, for on this depends the general health and

thrift of our stock, their feeding qualities and their ability to assimilate food and to use it to the best advantage. To this end it is necessary to guard against any tendency to legginess, shortness of ribs, narrowness of chest, and the long thin neck, void of muscle and of what is called strength of character, all indications of a lack of heart and lung capacity, which means the lack of ability to resist the encroachments of disease. These are considerations which are not so likely to engage the attention of the pork-packer, but they are all-important to the farmer, not only in view of his personal interests, but also as regards the general live stock interests of this country.

Canada has hitherto enjoyed a happy and singular immunity from all diseases of live stock, which has meant millions to us in the markets of Britain. We cannot be too careful to maintain our character in this regard. Yet it is not unknown to some who have the means of becoming acquainted with the facts that we have within the past year been perilously near if we have not actually crossed the border line of a clean bill of health as regards our swine. Of course we all know that there are periods of epidemic, and that stock are always liable to such visitations; but happily we have not had a general disease among our hogs for many years, and the isolated cases of trouble which have recently occurred may possibly be traced to constitutional defects or to defects in the care and management of herds. I think that it would be within the province of this Association to investigate the causes and to ascertain whether one breed is more liable to disease than another, so that the responsibility may be placed where it belongs.

We are all agreed no doubt that prevention is better than cure, and let us be careful to look to the foundation of our business. We must first breed for constitution as I have stated, and then give our stock every advantage such as exercise, fresh air, cleanly apartments, proper food, etc., in order that the vigor thus achieved may be perpetuated.

If there is any one thing in the management of hogs in which we in this country are more liable to make a mistake than another, I believe it is in the matter of exercise. I would like to emphasise this warning with all the force I can command, for I am fully persuaded that thousands of dollars are lost to our farmers annually by confining breeding sows to cramped enclosures and feeding them too much sloppy food, producing weak and flabby offsprings which, in many cases, die on the day of their birth. I know that a large, warm and well arranged piggery is an ambition which most breeders cherish, and if used with good judgment it may be made to do good service; but I have seen so many pigs ruined for life by being confined in fancy pens, that I have felt like condemning the whole arrangement and advocating a return to the good old system of giving the whole family of pigs the run of the barnyard in winter and of the fields in summer. I fully believe that this system with modifications is infinitely better for the health and vigor of the herd than the newer way of confining them in pens.

Another matter which lacks attention in this country, both in breeding and in management, is the production of strong bone; I don't mean coarse bone, but more of the texture of bone which breeders of horses seek to produce. The management of swine should be such as to strengthen the bone and thus to keep the legs and feet both sound and straight. American breeders and expert judges are ahead of us in this regard, and are paying nearly as much attention to these points as are the breeders and judges of horses. The best treatment to ensure this end is embodied in the word *exercise*, but the foundation for it is in selection and breeding.

There are many other points both in breeding and management which would properly come under the heading of this paper, but time and space do not admit of a reference to them now. Suffice it to say that the first great requisite in breeding is *constitution*, and that success in both breeding and management depends largely upon giving natural treatment, avoiding excesses, and supplying wholesome food of the sort calculated to build up bone and muscle and to develop a healthy and vigorous animal; for this, with abundant exercise, I am pursuaded, will do more to produce the quality of meat the market demands than the advocacy or acceptance of any particular breed.

SWINE STATISTICS.

The following statistics as to the number of swine in the various countries of the world, the imports of Great Britain, the exports of the United States, and the imports and exports of Canada have been prepared from the latest trade reports of the various countries.

The total numbers of domestic swine at present found upon the various continents, as far as reliable statistics can be obtained, are in round numbers as follows:

America	54,000,000
Europe	50,000,000
Australasia	1,200,000
Asia and Africa	800,000
Total	106,000,000

Number of Swine in various countries, 1885 to 1891.

Countries.	1885.	1886.	1887.	1888.	1889.	1890.	1891.
	No.	No.	No.	No.	No.	No.	No.
United Kingdom	3,686,628	3,497,165	3,720,957	3,815,643	3,905,865	4,362,040	4,272,764
Germany (1883)	9,206,195		9,210,000				
France	5,881,088	5,774,924	5,978,916	5,846,378	6,037,743		
Russia in Europe (1883)	9,361,980		9,200,000	9,242,997			
Finland			150,000				
Norway	101,020		100,000				
Sweden	515,556	548,210	571,114	610,469	621,635		
Denmark				770,785			
Holland	442,000	458,200	490,254				
Belgium	646,375		1,160,000				
Italy						1,800,000	
Austria (1880)	2,721,541		2,720,000				
Hungary (1884)	4,803,639		4,160,000				
Spain			4,470,000				
Greece			30,000				
Portugal			970,000				
Roumania			2,310,000				
Servia			1,700,000				
Cape Colony				142,479	159,835	148,609	
Algeria			300,000				
Australasia	1,039,338	1,053,978	1,100,478	1,075,316	1,043,743	1,172,520	
Canada (1881)	1,207,619						
Ontario	822,262	860,125	832,817	819,079	835,469	1,140,559	1,156,316
Manitoba			35,713		51,657		
United States	46,092,043	44,612,836	44,346,525	50,301,592	51,602,780	50,625,106	52,398,019
Argentine Republic			403,203				
Uruguay			17,127				
Paraguay		12,250					
India	518,700						

The imports by Great Britain of swine and swine-products were as follows for the years 1889, 1890 and 1891.

Articles.	Quantities.			Value.		
	1889.	1890.	1891.	1889.	1890.	1891.
	cwts.	cwts.	cwts.	£	£	£
Live Swine :						
From Denmark	19,719	1,420		79,036	5,671	
" Holland	1,675	362	540	3,138	1,205	1,808
" Canada						
" United States		1,086			4,054	
" other countries	3,930	1,168	2	13,154	3,544	1
Total	25,324	4,036	542	95,373	14,474	1,809
Bacon :						
From Denmark	575,304	465,866	580,868	1,639,753	1,334,096	1,582,878
" Germany	63,639	1,390	3,748	184,659	3,459	9,397
" United States	2,547,643	2,934,465	2,675,054	4,810,458	4,890,992	4,517,665
" other countries	311,558	388,849	250,539	652,337	749,514	540,384
Total	3,498,144	3,790,570	3,510,209	7,287,207	6,978,061	6,650,324
Hams :						
From United States	873,304	1,094,383	1,116,441	2,217,087	2,583,745	2,580,573
" other countries	104,304	115,063	88,362	284,397	285,370	210,864
Total	977,608	1,209,446	1,204,803	2,501,484	2,869,115	2,791,437
Pork, salted (not hams) :						
From United States	191,767	204,577	170,075	282,816	282,174	233,753
" other countries	77,820	50,280	56,723	107,449	59,250	63,179
Total	269,587	254,857	226,798	390,265	341,424	296,932
Pork, fresh :						
From Holland	90,015	25,994	90,114	218,123	61,951	215,669
" Belgium	14,929	10,888	31,322	37,625	27,397	75,538
" other countries	11,902	8,413	6,082	30,391	20,486	11,518
Total	116,846	45,295	127,518	286,139	109,834	302,725
Lard :						
From United States	1,151,372	1,248,947	1,025,399	2,097,419	2,049,747	1,674,521
" other countries	42,459	24,289	25,885	80,989	41,957	45,530
Total	1,193,831	1,273,236	1,051,284	2,178,408	2,091,704	1,720,051

Canadian Hog Exports to Great Britain.

——	Total British Imports for year ended Dec. 31, 1891.	Exports from Canada for year ended June 30, 1891.
	$	$
Swine	8,804	75
Pork	2,918,332	40
Bacon and hams	45,949,903	625,997
Lard	8,370,915	1,862
Total	57,247,954	627,974

Exports from Canada of Hog Products for year ended June 30, 1891 :

Country to which exported.	Bacon.	Ham.	Pork.	Lard.	Total.
	$	$	$	$	$
Great Britain	589,599	36,398	40	1,862	627,899
B. W. Indies	458	694	148	244	1,544
Newfoundland	667	347	2,596	58	3,668
China	4				4
Japan	6				6
United States	118	57	198	970	1,343
D. W. Indies		22			22
F. W. Indies		99			99
St. Pierre			1,107	40	1,147
Total	590,852	37,617	4,089	3,174	635,732

Imports of Hogs and Hog Products into Canada for year ended June 3, 1891 :

——	Value.	Duty.
	$	$ c.
Hogs (live) for consumption in Canada	12,693	4,794 78
Hogs to be slaughtered in bond for export	261,711	
Bacon and hams for consumption	208,173	77,112 14
Pork for consumption	596,588	166,756 07
Lard for consumption	69,174	29,749 98
Total imports	1,148,339	278,412 97
Total exports	635,732	
Excess of imports over exports	502,607	

Exports from United States for year ended June 30, 1891 :

——	Bacon.	Ham.	Pork.	Lard.	Total.	Live Hogs.
	$	$	$	$	$	$
United Kingdom	30,429,839	6,546,179	1,370,988	11,037,910	49,384,916	
Germany	394,531	46,385	137,492	7,048,606	7,627,014	
France	2,300	3,959	12,179	3,909,177	3,927,615	
Belgium	2,788,363	715,562	9,756	3,352,419	6,866,100	
Netherlands	796,377	58,587	19,687	1,948,183	2,822,834	
Canada	1,001,367	228,638	769,502	351,943	2,351,450	266,447
Mexico	4,177	34,822	357	109,816	149,172	846,246
Brazil	801,785	1,557	4,559	1,304,970	2,112,871	
Cuba	351,955	234,458	33,315	2,079,534	2,699,262	525
Hayti	433	43,348	976,307	235,782	1,255,870	
Venezuela	2,205	91,171	4,151	452,085	549,612	
Other countries	831,657	241,019	1,505,408	2,583,898	5,161,982	33,412
Total	37,404,989	8,245,685	4,843,701	34,414,323	84,908,698	1,146,630

Exports of Hog-products from Canada and United States for ten years (Bacon, Hams, Pork and Lard).

Year.	Canada.		United States.	
	lb.	$	lb.	$
1882	11,500,201	1,179,348	798,842,846	82,852,946
1883	5,112,406	575,082	627,087,446	70,966,268
1884	8,963,712	850,745	715,142,817	69,753,513
1885	8,771,082	758,015	755,416,926	64,883,110
1886	9,008,385	679,485	800,784,530	57,125,408
1887	12,202,325	955,362	827,349,998	61,659,925
1888	7,389,128	688,661	732,079,843	59,299,852
1889	4,443,381	407,884	772,601,275	66,716,097
1890	7,813,415	651,432	1,159,642,885	85,281,174
1891	7,669,658	635,732	1,179,565,831	84,908,698
Total	82,473,693	7,379,746	8,368,514,397	703,446,991
Average	8,247,369	737,975	836,851,440	70,344,699

Pure-bred Swine imported free into Canada for improvement of stock.

	1890.		1891.	
	No.	Value.	No.	Value.
		$		$
From Great Britain	62	1,675	36	1,242
From United States	117	2,044	144	2,959
Total	179	3,719	180	4,201

Exports of Swine, the produce of Canada.

	1890.		1891.	
	No.	Value.	No.	Value.
		$		$
To Great Britain			3	75
Newfoundland	30	201	33	153
United States	422	1,776	88	888
St. Pierre	218	1,175	210	838
Total	670	3,152	334	1,954

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